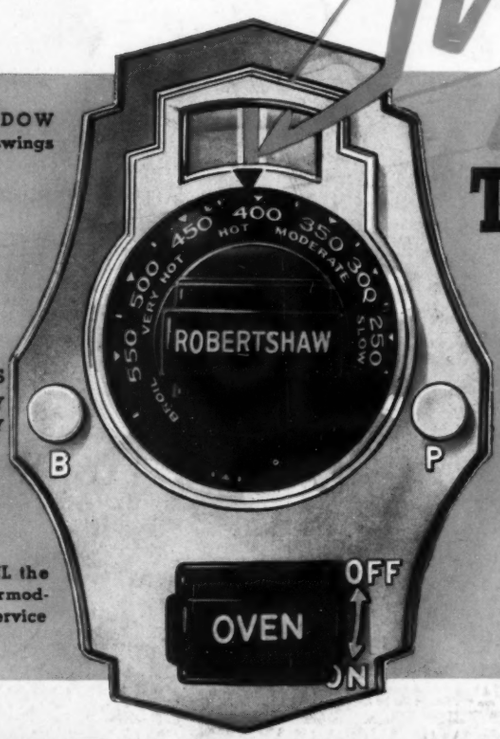
GAS

FORMERLY WESTERN GAS

ENGINEERING • UTILIZATION • LOAD-BUILDING • MANAGEMENT

SEE the *signal*? That's the Thermal Eye in action. With it, the new Robertshaw oven-heat-control brings action to range selling! • The instant the oven reaches the temperature set by the dial this bright red signal swings into view. Thermal Eye is both a service feature and an eye-catcher. Women don't go by. They *buy!* • Just display ranges that are equipped with the new Thermal Eye control. They'll signal SALES for you!

HERE'S THE *Signal* **THAT CLOSES THE** *sale!*



IN THE WINDOW the red signal swings into view.

OVEN BY-PASS (B) and safety pilot (P) are easily adjusted.

ON THE BEZEL the oven cock. Other models for every service need.

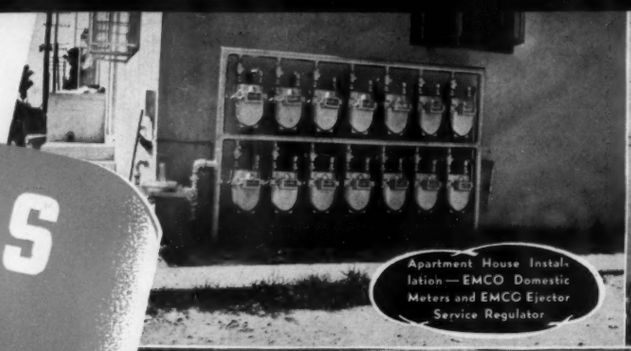
ROBERTSHAW THERMOSTAT COMPANY
Youngwood, Pa.

OVER 2,800,000 IN USE

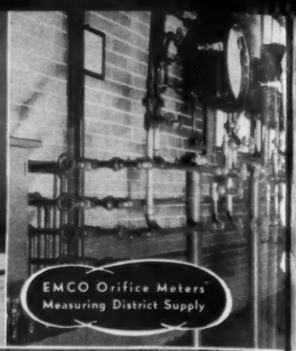
ROBERTSHAW OVEN-HEAT-CONTROL *with the* **Thermal Eye**

DEPARTMENT OF COMMERCE
APR 11 1937
FINANCIAL DIVISION

EMCO METERS for ACCURATE MEASUREMENT

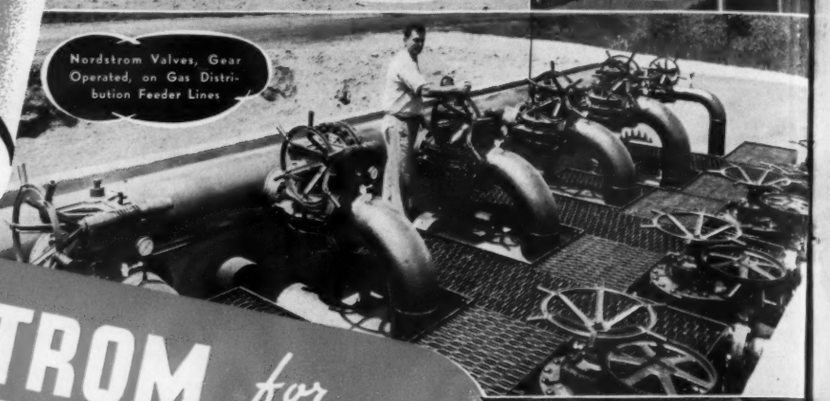


Apartment House Installation — EMCO Domestic Meters and EMCO Ejector Service Regulator



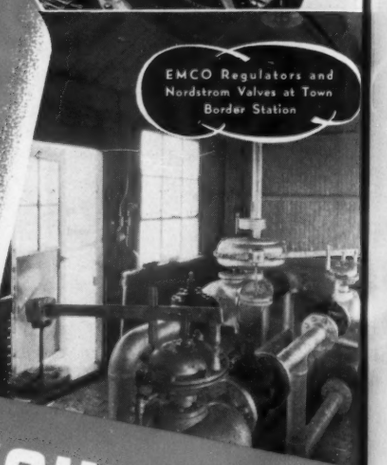
EMCO Orifice Meters Measuring District Supply

CRAWFORD Sensitive Regulators with EMCO-Nordstrom Valves

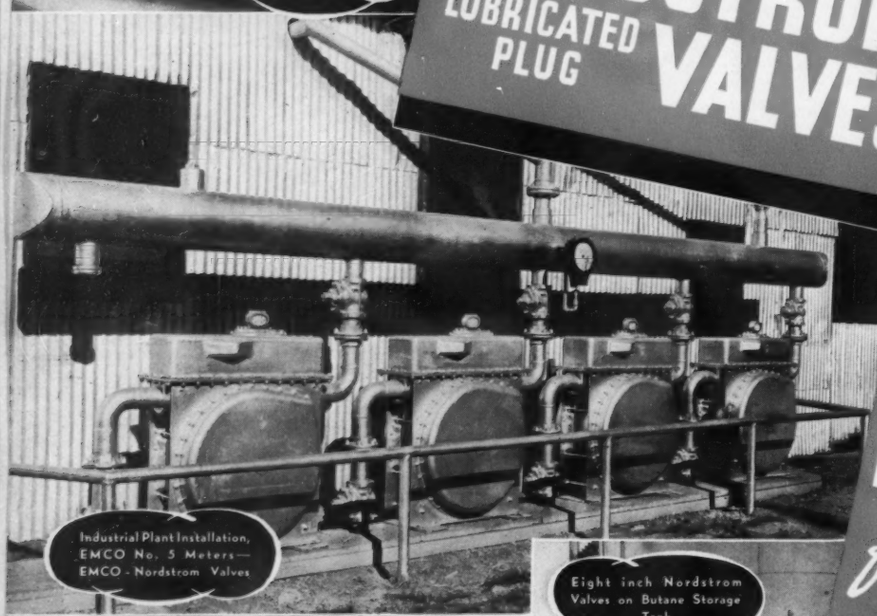


Nordstrom Valves, Gear Operated, on Gas Distribution Feeder Lines

NORDSTROM LUBRICATED PLUG VALVES for EVERY MAJOR VALVE NEED



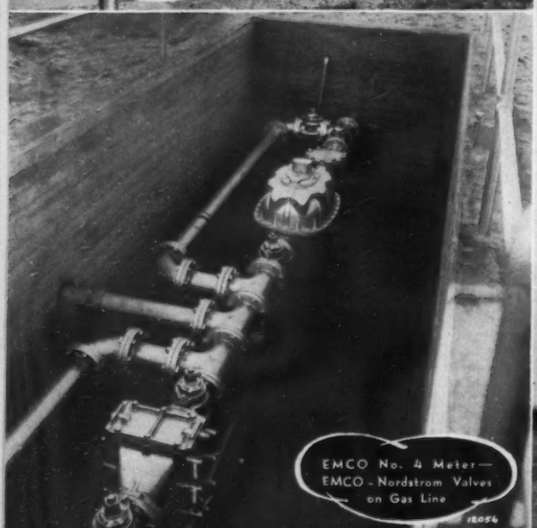
EMCO Regulators and Nordstrom Valves at Town Border Station



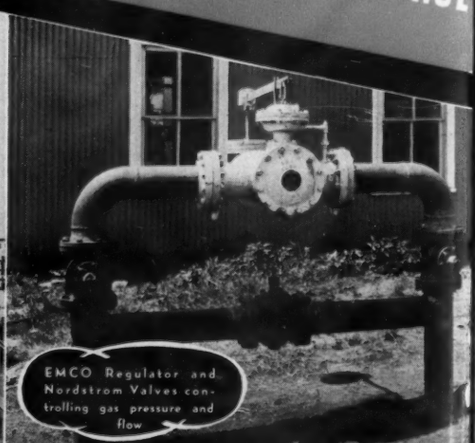
Industrial Plant Installation, EMCO No. 5 Meters — EMCO - Nordstrom Valves

EMCO REGULATORS for CONSTANT PRESSURE CONTROL

Eight inch Nordstrom Valves on Butane Storage Tank



EMCO No. 4 Meter — EMCO - Nordstrom Valves on Gas Line



EMCO Regulator and Nordstrom Valves controlling gas pressure and flow

PITTSBURGH EQUITABLE METER CO.
MERCO NORDSTROM VALVE CO.

MAIN OFFICES PITTSBURGH, PA.

ATLANTA BUFFALO CHICAGO MEMPHIS
NEW YORK COLUMBIA KANSAS CITY PHILADELPHIA TULSA HOUSTON LOS ANGELES OAKLAND

Barrett
PIPE LINE
ENAMELS

FIELD SERVICE

The Barrett Company maintains a Pipe Line Service Department to assist engineers in all coating problems, and also has available Field Service men whose assistance is offered where Barrett's protective coatings are used. Inquiries are invited.

MAXIMUM WATERPROOFING

The waterproofing agent in Barrett Pipe Line Enamels is coal-tar pitch — the most stable bituminous material known. Combined with it in correct proportions is a special flake-type reinforcement. Together these elements not only provide maximum waterproofing and protection from corrosion, but also exceptional resistance to damage from soil stresses. In addition, these enamels possess lasting dielectric qualities and high resistance to alkalis and soil acids.

THE BARRETT COMPANY
40 Rector Street, New York, N. Y.

Reproduction of the micrograph at the left shows the interlocking of the flakes of the internal reinforcement used by Barrett. By laminating with the waterproofing agent, they give Barrett Pipe Line Enamels unusual toughness and resistance to soil stresses.

For pipe of large diameter, The Barrett Company will furnish equipment required to revolve pipe and spread enamel.

ADVERTISERS' INDEX

The American Brass Co.	27
American Gas Products Corp.	51
American Hammered Piston Ring Division of Koppers Co.	6, 7
American Liquid Gas Corp.	71
American Meter Co.	14
American Stove Co.	—
The Barber Gas Burner Co.	80
Barber Greene	4
The Barrett Co.	1
Bartlett Hayward Div. of Koppers Co.	6, 7
Barton Brown Engineering Corp.	71
H. R. Basford Co.	86
Blaw-Knox Co.	85
The Bristol Co.	63
The Cast Iron Pipe Research Ass'n.	3
The Chaplin-Fulton Manufacturing Co.	78
Clark Hotel	86
The Cleveland Trencher Co.	9
Colonial Shops	82
Condensation Engineering Corp.	87
Connelly Iron Sponge & Governor Co.	84
The Cooper-Bessemer Corp.	8
Crane Co.	83
Cribben & Sexton Co.	12
Dearborn Chemical Co.	82
Detroit Michigan Stove Co.	35
Domestic Manufacturing Co.	80
S. R. Dresser Manufacturing Co.	23, 25
Ducommun Metals & Supply Co.	65
Electrogas Furnace & Mfg. Co.	84
Engineering and Construction Division of Koppers Co.	6, 7
Ensign Carburetor Co., Ltd.	77
Fluor Corporation, Ltd.	11
Forster Manufacturing Co., Ltd.	—
Fraser Furnace Co.	86
Gas and Coke Div. of Koppers Co.	6, 7
General Controls	76
James Graham Manufacturing Co.	41
Greenlee Tool Co.	81
Grove Regulator Co.	—
Johns-Manville	—
Johnson Gas Appliance Co.	88
Kerotest Manufacturing Co.	70
Kitson Co.	77
Koppers Co.	6, 7
Lycoming Manufacturing Co.	33
Merco-Nordstrom Valve Co.	2nd Cover
Milwaukee Gas Specialty Co.	88
Minneapolis-Honeywell Regulator Co.	10
L. J. Mueller Furnace Co.	43
Mueller Co.	3rd Cover
The National Supply Co.	5
National Tube Co.	61
Natural Gas Equipment, Inc.	—
Norge Division, Borg-Warner Corp.	49
Pacific Coast Gas Association, Inc.	72
Pacific Gas and Electric Co.	75
Pacific Gas Radiator Co.	79
Parkhill-Wade, Inc.	83
Payne Furnace & Supply Co.	59
Pittsburgh Equitable Meter Co.	2nd Cover
Porcelain Enamel Institute	37
Pressed Steel Tank Co.	71
Reliance Regulator Corp.	66
Republic Steel Corp.	39
Reynolds Gas Regulator Co.	87
Robertshaw Thermostat Co.	1st Cover
George D. Roper Corp.	57
Safety Gas Main Stopper Co.	84
Servel, Inc., Electrolux Sales Div.	28, 29, 30, 31
M. B. Skinner Co.	—
Spencer Thermostat Co.	55
The Sprague Meter Co.	4th Cover
Tar & Chemical Div. of Koppers Co.	6, 7
United States Pipe & Foundry Co.	79
United States Steel Corp.	61
Ward Heater Co., Ltd.	53
Webster Engineering Co.	47
Welsbach Co.	85
Western Gas Division of Koppers Co.	6, 7
The Wood Preserving Corp.	6, 7
Worthington Pump & Machinery Corp.	45

GAS

FORMERLY WESTERN GAS

LOS ANGELES Office: 810 South Spring Street. Phone Michigan 1481
CHICAGO Office: 1064 Peoples Gas Building. Phone Harrison 8536

JAY JENKINS, Publisher GEORGE H. FINLEY, Editor CRAIG ESPY, Mid-Western Manager
ARTHUR ROHMAN, Managing Editor ANATOL FOMILYANT, News Editor
W. G. RUSSELL, Field Representative

Contents for April, 1937

GUEST EDITORIAL: MODERNIZATION . . *By Hugh H. Cuthrell* 13

Memphis Meeting Hits New High for Southern Gas Men . . . *By Craig Espy* 15

Testing and Appraising Large Volume Water Heating Installations *By J. Louis Oberseider* 17

Diversified Program Announced for Kansas City Natural Gas Meeting *By Chas. D. Greason* 20

Summer Air Conditioning with Gas . . . . *By O. A. Kinzer* 22

GAS Camera 26

The Advantages of Natural Gas over Diesel Engines *By C. Remschel* 32

Personalizing Customer Contacts . . . *By Anatol Fomilyant* 34

ABSTRACTS BY THE STAFF:

Effect of Fluctuating Gas Pressure on Domestic Appliance Performance . . . *By C. Eldon White and C. W. Stewart* 36

Gas Range Pressure Regulators . . . . . *By A. H. Mills* 40

The Growing Field for Unit Heaters . . . *By R. L. Towne* 40

A Discussion of the Sliding Vane Type Rotary Gas Compressor . *By H. W. Walters* 42

Some Experiences in Selling High Priced Gas to Industry . . . *By Nathan Schofer* 44

Training Service Men in the Use of Gas Boiler Controls . . . *By C. P. Perkins and Chas. Consterdine* 46

Lubrication of Natural Gas Engines and Compressors 48

MEASUREMENT AND CONTROL 67

The Joliet Reference Meter . . *Abstract By C. B. Heartwell* 67

BUTANE-PROPANE NEWS 68

Butane—Its Use as a Substitute and Standby Gas . . . . . *By P. C. DeHaan* 68

April, 1937. Volume XIII, Number 4. GAS is published monthly by Western Business Papers, Inc. at 810 South Spring Street, Los Angeles, California. Subscription price (in advance), 25 cents the copy. $1.00 per year; other than U. S., $2.00 per year. Entered as second class matter August 20, 1936, at the post office at Los Angeles, Calif., under the Act of March 3, 1879. Copyright, 1937.

MEMBER AUDIT BUREAU OF CIRCULATIONS

OFFICIAL PUBLICATION: Pacific Coast Gas Association; Southern California Meter Association.

MEMBER: Audit Bureau of Circulations; Associated Business Papers, Inc.

THEN . . .

The same long-lived material

A CENTURY AGO—
A cast iron gas main which has been in service in Baltimore for more than a century.

AS NOW

but with modern mechanical joints

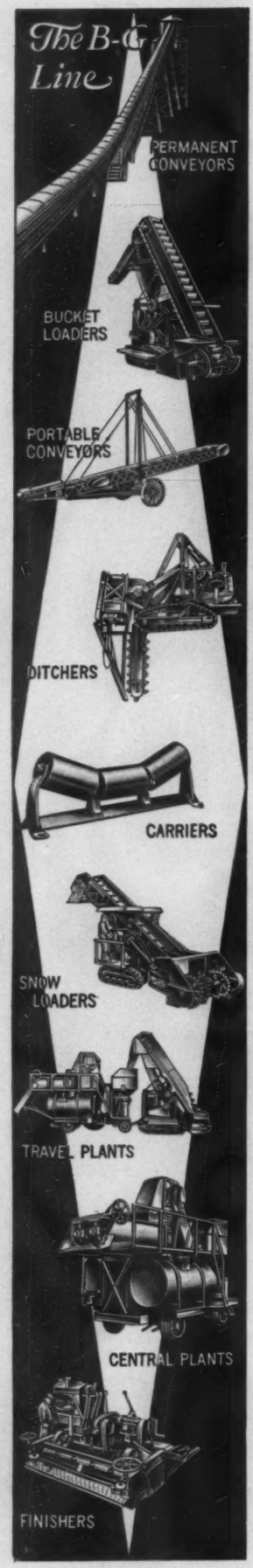
TODAY—A recent installation of mechanical joint cast iron pipe for gas service.

Cast iron pipe marches on in step with the progress of the gas industry from its earliest days. An installation of cast iron pipe, made by the first gas company to be granted a franchise in America, is still functioning. Today's mechanical joint cast iron pipe—gas tight and long-lived—meets modern operating conditions. Made by C. I. P. R. A. members in diameters from 1¼ to 84 inches.

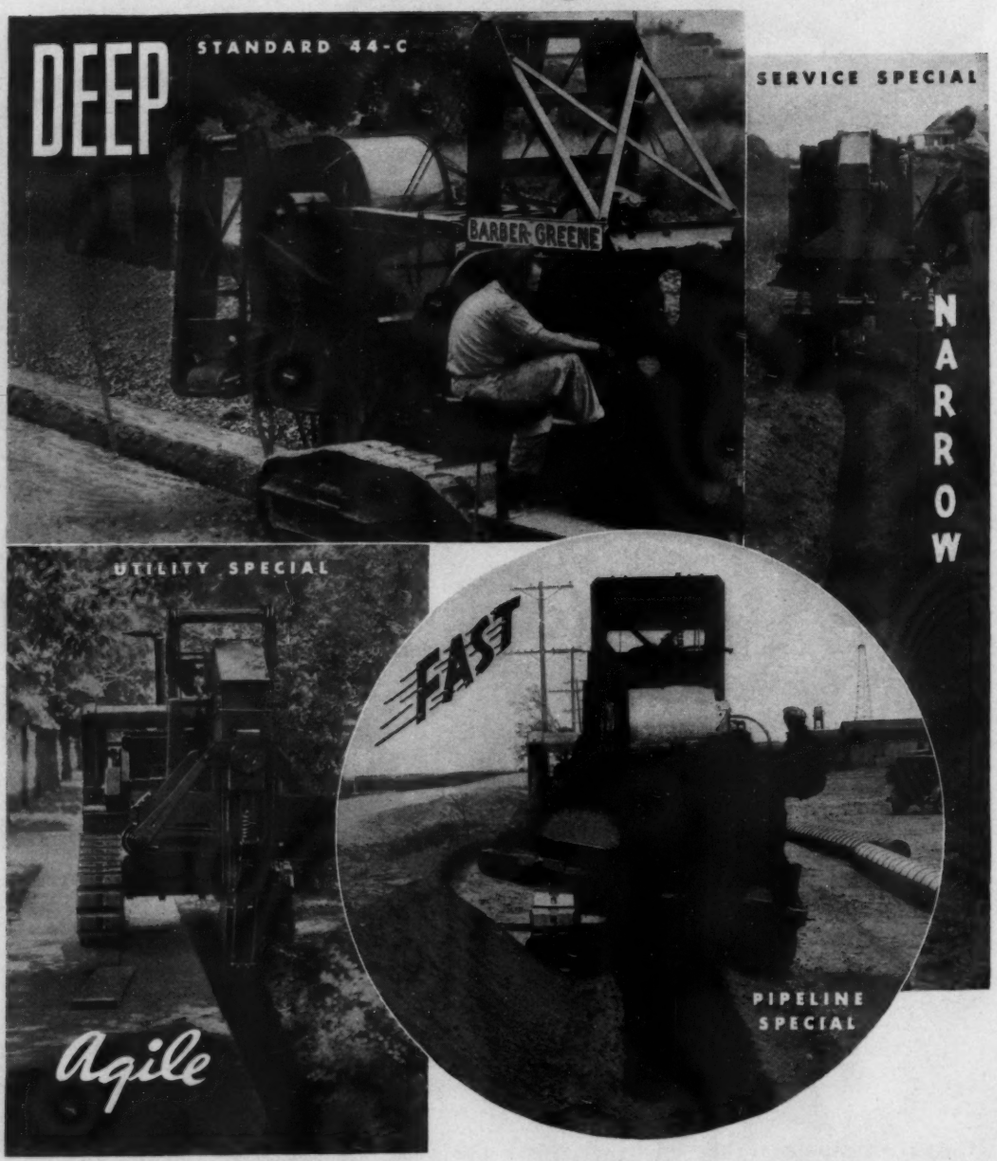
CAST IRON PIPE

THE STANDARD MATERIAL FOR UNDERGROUND MAINS

The Cast Iron Pipe Research Ass'n, Thos. F. Wolfe — **Research Engr., 1013 Peoples Gas Bldg., Chicago**



4 Barber-Greenes



The same exclusive basic design applies to all B-G Ditchers. They have demonstrated their milling ability through Florida's coral rock. The self-cleaning buckets have proven themselves in the stickiest gumbo, and the records set by B-G's in the oil fields show dependability and speed that insures profitable ditching.

All four Barber-Greene Ditchers have the Patented Vertical Boom that digs straight down, the Automatic Overload Release that protects the machine and underground pipe, Self-Cleaning Buckets, Milling Action Digging, and full Crawler Mounted Maneuverability.

The Standard 44-C digs down to 8'3" deep. The Pipe Line Special has the extra speed that pays real dividends in mile after mile of ditching. The Utility Special has the B-G Off-Set boom that digs up close to obstructions on either side. And the Service Special is so narrow and compact it pays for itself on jobs as small as service connections. Write for literature today, there is no obligation.

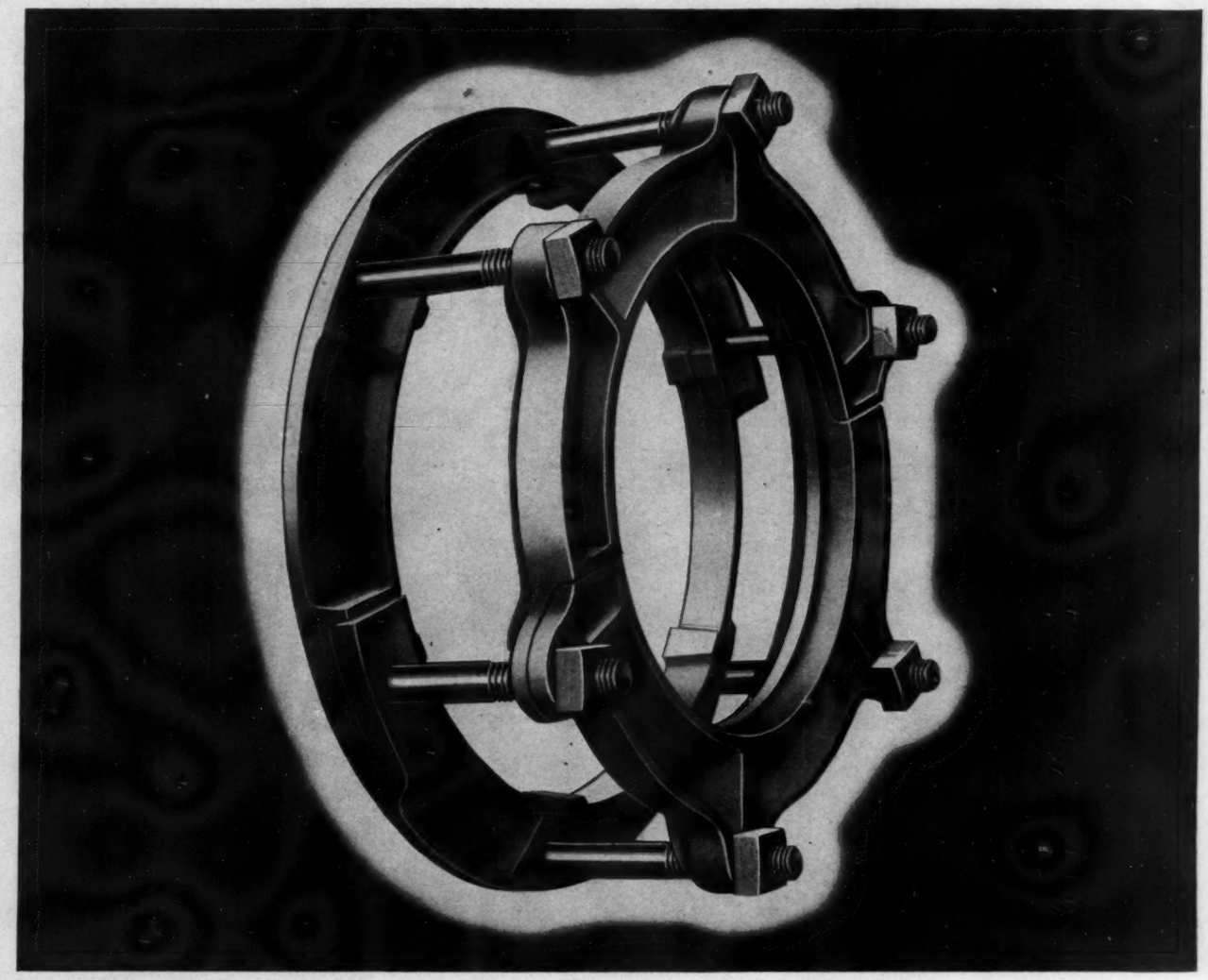
37-7

Standardized Material Handling Machines

BARBER GREENE

715 West Park Avenue, Aurora, Illinois

For a Permanent repair of leaks in Bell and Spigot Pipe joints



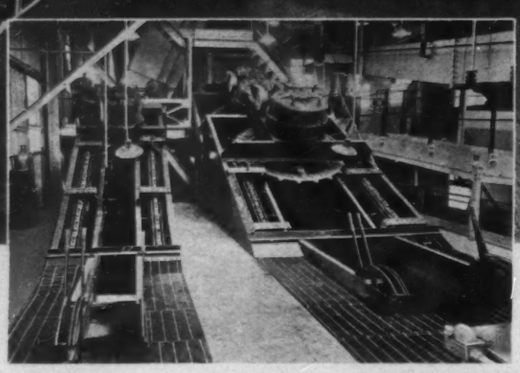
Use **DAYTON No. 12-B CLAMPS**

THE NATIONAL SUPPLY CO. OF DELAWARE
DAYTON COUPLING DIVISION · · DAYTON · OHIO

Koppers Divisions, Subsidiaries, and Affiliates Serving the Gas Field

WESTERN GAS DIVISION	FORT WAYNE, INDIANA
BARTLETT HAYWARD DIVISION	BALTIMORE, MD.
ENGINEERING & CONSTRUCTION DIVISION	PITTSBURGH, PA.
THE KOPPERS COAL COMPANY	PITTSBURGH, PA.
KOPPERS-RHEOLAVEUR COMPANY	PITTSBURGH, PA.
THE WOOD PRESERVING CORPORATION	PITTSBURGH, PA.
NATIONAL LUMBER & CREOSOTING COMPANY	TEXARKANA, ARK.
AMERICAN HAMMERED PISTON RING DIVISION	BALTIMORE, MD.
TAR AND CHEMICAL DIVISION	PITTSBURGH, PA.
GAS AND COKE DIVISION	PITTSBURGH, PA.
EASTERN GAS AND FUEL ASSOCIATES	BOSTON, MASS.
THE WHITE TAR COMPANY OF NEW JERSEY, INC.	KEARNY, N. J.

KOPPERS



MUCH COAL FOR GAS-MAKING IS CLEANED IN KOPPERS-RHEOLAVEUR PLANTS—Koppers is interested in cleaning methods to produce the highest quality coal for use in ovens operated for the making of coke oven gas. Cleaning is particularly important with the increased use of mechanical mining methods. Koppers controls the Rheolaveur Process in this industry, and has built many coal cleaning plants.

THESE "WESTERN" MECHANICAL TIME CYCLE CONTROLS ARE A NEW TYPE AUTOMATIC CONTROL WHICH MEETS THE DEMAND FOR A SIMPLE UNIT FOR WATER GAS SETS—This photograph shows four Model "U" Time Cycle Controls at the plant of New Orleans Public Service, Inc., New Orleans, La.

The Model "U" was recently designed especially for plants where water gas sets are used alternately or for standby service. The capital investment is low. These controls can be adapted to any length of cycle; Model "U" Controls are now in operation on cycles ranging from three minutes to one and one-half hours. Write for Bulletin 317.

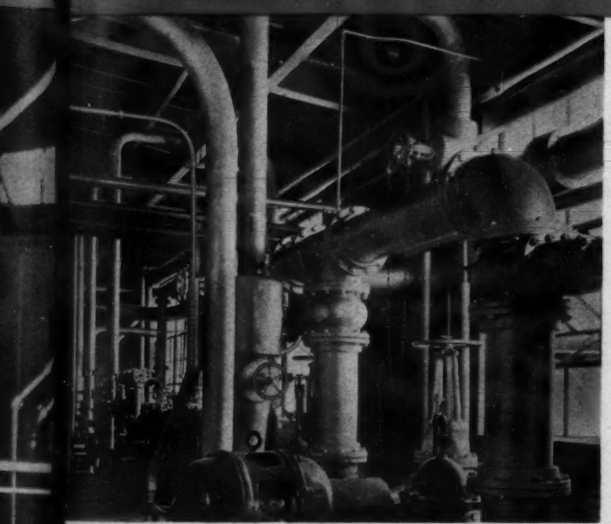
To meet special conditions, the Model "U" Controls shown in the photo are equipped with Model "E" Control type indicators, automatic shut-downs and hand selector mechanism, but in most installations these auxiliaries are not necessary.

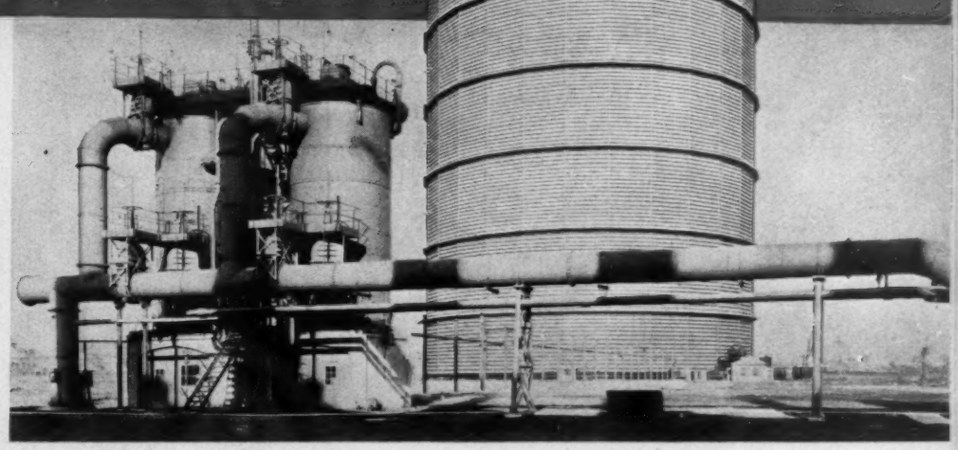
The Western Gas Division of Koppers also produces many other types of apparatus for gas companies.

KOPPERS COMPANY . . DESIGNERS . . BUILDERS . . PRODUCERS . . MANUFACTURERS

CREOSOTED LUMBER (FROM THE WOOD PRESERVING CORPORATION) ADDS TO THE LIFE OF COAL-UNLOADING DOCKS—The coal-unloading dock in this photograph includes breastwork of creosoted timber and mooring pile clusters. All piles are southern yellow pine treated with 16 lbs. of Grade One Coal-Tar Creosote by the full-cell pressure process. The breast wall timbers are white oak, to resist the abrasion from the barges; all other timber is southern yellow pine treated with 8 lbs. of Grade One Creosote by the empty-cell pressure process. The Wood Preserving Corporation, Koppers subsidiary, also supplies pressure-treated cross-ties, poles, cribbing, fence posts and other types of treated timber.

serves the gas industry





KOPPERS LUMINO MAKES BRIGHT, LIGHT-REFLECTING CORROSION-RESISTING SURFACES—Lumino is a bituminous-base aluminum paint which gives the equivalent of two coats with one application. Its bituminous base forms an impermeable, waterproof black film which prevents corrosion of metal surfaces and disintegration of concrete, and its Alcoa Albron aluminum powder "leafs" to the surface and makes an overlapping metallic protective finish of great hiding power and brightness. Let us send you the descriptive folder.

KOPPERS PURCHASES CRUDE TAR—Koppers is interested in the purchase of crude tars (coke oven, water gas or retort tars.)

KOPPERS BARTLETT HAYWARD DIVISION AT BALTIMORE BUILT THESE FELD SCRUBBERS AND THIS WATERLESS GAS HOLDER—These Feld-Type Tar and Naphthalene Scrubbers have an ultimate daily capacity of 50,000,000 cubic feet, and the holder is a 15,000,000 cubic foot waterless holder. Bartlett Hayward Feld Type Scrubbers are used for the removal of tar. naphthalene, cyanogen, ammonia, light oils and other products from manufactured gas, and dust from producer and blast furnace gas; for the recovery of gasoline from natural gas and for many chemical processes requiring intimate contact between gas and liquids.

KOPPERS COAL TAR PITCH ROOFS PROTECT MANY GAS COMPANY BUILDINGS—Koppers Coal Tar Pitch and Tarred Felt Roofings should be used on any buildings with flat roofs. Coal Tar Pitch is the one material best able to withstand prolonged contact with water, without disintegrating. Coal Tar Pitch should therefore be specified wherever roofing is to be exposed to water for long periods.

Koppers Company, Pittsburgh, Pa.
Please send me information about: G-4

- ☐ Bulletin 317 on Western Mechanical Time Cycle Controls
- ☐ Coke Oven Plants
- ☐ Water Gas Sets
- ☐ Heavy Oil Water Gas Processes
- ☐ Other Gas Manufacturing Plants
- ☐ Scrubbers
- ☐ Conveying Systems
- ☐ Fast's Self-aligning Couplings
- ☐ Treated Lumber
- ☐ Floor Stands
- ☐ Fire Hydrants
- ☐ Gas Purification Plants
- ☐ Motor Fuel Recovery Plants
- ☐ Oil Foggers
- ☐ Bituminous Paints
- ☐ Coal Tar Pitch and Felt Roofing
- ☐ Waterproofing Materials
- ☐ Pipe
- ☐ American Hammered Piston Rings
- ☐ Coal Tar Paving Materials
- ☐ Sulphur Recovery
- ☐ Gas Holders
- ☐ Tanks
- ☐ Gas, Air, Tar and Water Valves
- ☐ Disinfectants
- ☐ Insecticides
- ☐ Deodorants

Your Name.....

Address.....

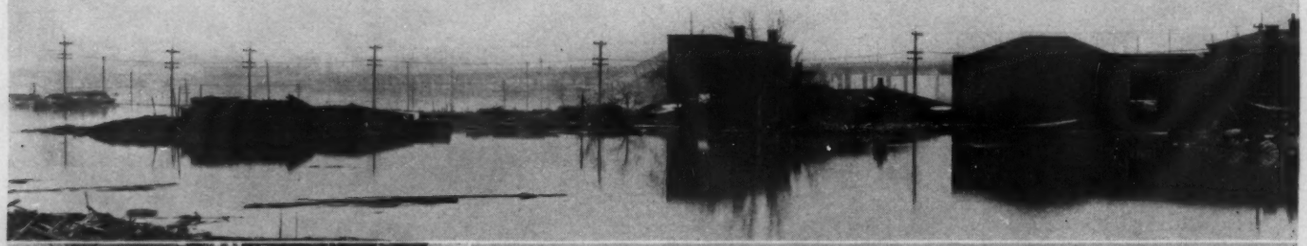
.....

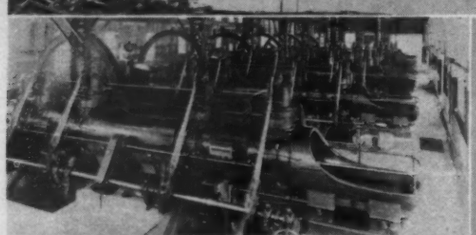
DISTRIBUTORS

PITTSBURGH, PA. — *March Flood, 1936* — The gas service continued without interruption.

..But the Gas Industry Carried on!

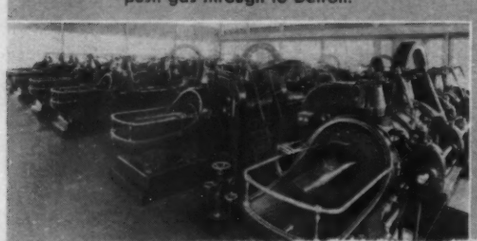
CINCINNATI, OHIO — *January Flood, 1937* — Gas service was available continuously.





These 24-year-old Cooper-Bessemers at Branchland, W. Va., push gas through to Cincinnati.

These new Cooper-Bessemers at Haven, Kansas, push gas through to Detroit.



IN March of '36, the angry flood waters swirled through Pittsburgh streets. Yet the GAS service never failed! Ten months later, the same thing happened in Cincinnati. Gas history was repeated!

High water holds no terrors for the GAS utilities that depend on slow-speed, long-lived compressor units. History has proved their reliability!

The old and new installations, shown here, are "brothers under the skin." Although the *modern* units are greatly improved, they are still low-speed and heavy-duty!

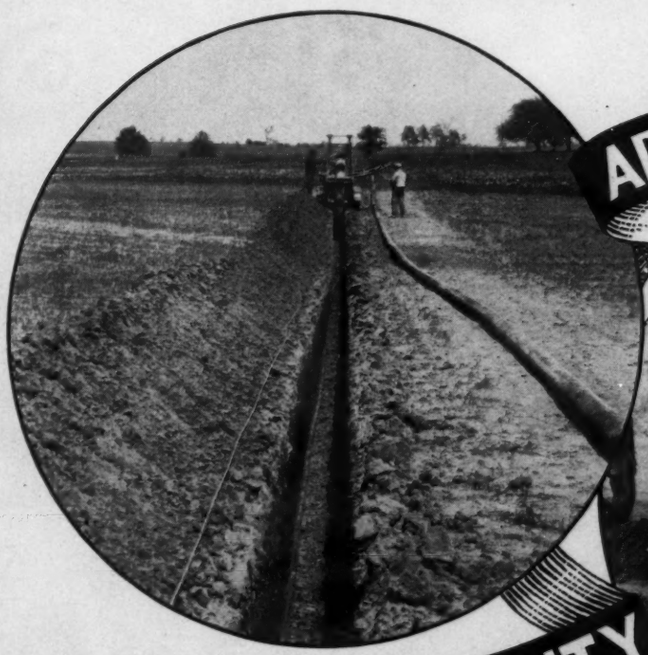
THE COOPER-BESSEMER CORPORATION

Mt. Vernon, Ohio — PLANTS — Grove City, Pennsylvania

Hoffar's Limited, Vancouver, B. C.
25 West 43rd St., New York City.
640 East 61st St., Los Angeles, Calif.
Mills Bldg., Washington, D. C.
The Pacific Marine Supply Co., Seattle, Washington
53 Duncan St., Gloucester, Mass.
Esperson Bldg., Houston, Texas

The COMPLETE TRENCHER—

The CLEVELAND "BABY DIGGER Model 95"



ADEQUATE STRENGTH

MAXIMUM MOBILITY

EXTREME COMPACTNESS

In todays' Cleveland "Baby Digger Model 95," you will find the complete answer to your trenching requirements. Over fifteen years of pioneering in the building of modern practical equipment, plus a knowledge of requirements and a desire to build the best, without regard to price, make this machine pre-eminent from a standpoint of all around value.

Very compact, being less than 58" in over-all width, weighing less than five tons, it is supremely easy to handle and maneuver in limited working spaces. Now, much faster, more rugged, and full of new improvements, the Baby Digger stands ready to save your money on all trench work up to 5½' deep and from 10½" to 23½" wide. Quickly, easily transported from job to job on its special trailer.

Let us furnish details.

THE CLEVELAND TRENCHER COMPANY

"Pioneers of the Small Trencher"

20100 St. Clair Ave. Cleveland, Ohio.

The CLEVELAND BABY DIGGER Model 95

Equally Accepted
. . . IN EVERY COMMUNITY

AUTOMATIC CONTROLS MH

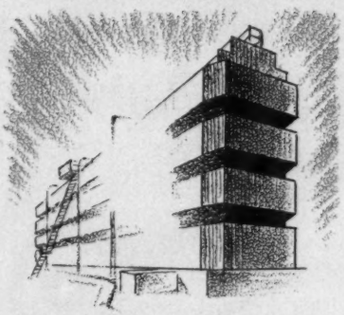
THE
GAS COMPANY
AND
MINNEAPOLIS - HONEYWELL
AUTOMATIC CONTROLS

DEPENDABLE CONTROLS COST LESS THAN SERVICE

YOUR company enjoys the confidence of the people in the community it serves. The same feeling of confidence holds true as regards Minneapolis-Honeywell automatic controls. More than half a century of automatic control experience with countless laboratory and field research are behind every Minneapolis-Honeywell control system. Give your customers every chance to be satisfied with gas heat. Recommend and install complete Minneapolis-Honeywell controls on every job. Minneapolis-Honeywell Regulator Company, 401 East 28th Street, Minneapolis, Minnesota. Branch and distributing offices in all principal cities.

MINNEAPOLIS-HONEYWELL
Control Systems
BROWN INDUSTRIAL INSTRUMENTS FOR INDICATING, RECORDING AND CONTROLLING

LONG LIVE the GIANT



Fluor Aerator Type Cooling Towers are free from wind-blown spray. Water make-up requirements are reduced to the minimum. Perfect filming is effected by double panel bowed cooling decks, a design exclusive to Fluor. Pressure loss through aerators is negligible at wind velocities under six miles per hour; with increasing wind, pressure drop increases, which means that velocity across the cooling surface does not increase in proportion. As a result, water distribution is undisturbed; spray is not carried through the tower; cooling performance is uniform.

Thirty-two hundred years ago this tree was born. Ages ago it was felled by some smashing bolt of lightning, or prostrated by cyclonic wind. Meanwhile, it has been scorched by parching sun and chilled by frosty nights, pelted by torrential rains and buried in Sierra snows. After years of elemental abuse, though organically dead, its body is still strong and sound, untouched by decay. Such is the character of California Redwood.

Fluor Aerator Type Cooling Towers are built of this California Redwood, unsurpassed for its resistance to fire, water, heat, dryness and extremes in temperature. Add the inherent qualities of Fluor's structural material to the scientific merits of Fluor design and engineering and you have the Aerator Type Cooling Tower in which efficiency, space economy, water economy, good appearance and long life are combined.

FLUOR SECURE WITH FLUOR **AERATOR TYPE COOLING TOWERS**

THE FLUOR CORPORATION, LTD. *Main Office and Plant:* 909 East 59th Street, Los Angeles, Calif. 909 McCormick Bldg., Chicago, Ill. . . . 703 Fairfax Bldg., Kansas City, Mo. . . . 1402 Esperson Bldg., Houston, Texas . . . 710 Canadian Pacific Bldg., New York City, N. Y. . . . 30 Church Street, New York City, N. Y. . . . 719 McBirney Bldg., Tulsa, Okla.

★ *The Gas Service* is only as modern as the gas range ★

The standard of oven cooking performance depends entirely on the devices contained in the range.

The Universal Precision Oven with its scientifically engineered devices: (1) Equalator Precision Oven Burner; (2) Temperature Stabilizers; (3) Extra Heavy Insulation; (4) Automatic Oven Heat Control . . . makes possible a new and higher standard of oven cooking performance.

Universal Gas Ranges With Their Scientifically Designed Precision Draftless Oven Bring Definite Advantages to the Homemaker that Mean New Economies in Time, Food, Fuel and Effort

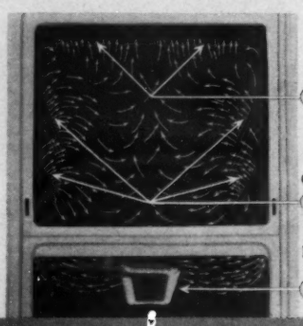
● The Universal Precision Oven presents a new and higher standard of convenient oven cooking service to the Homemaker. It simplifies every phase of oven cooking—eliminating all the complicated, laborious and time-consuming practices of outmoded oven cooking methods.

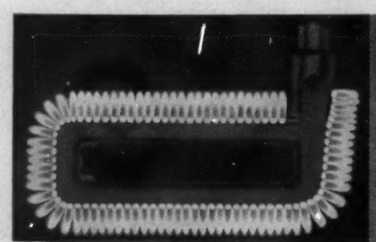
The Universal Precision Oven gives increased operating efficiency, plus greater speed in bringing the oven to any desired temperature.

With its Equalator Precision Oven Burner, it makes possible oven canning —the successful baking of fruit cakes—and other oven cooking accomplishments in which the maintenance of uniform, long time, low oven temperatures is a vital necessity.

It gives perfect balanced uniform oven heat distribution, making it possible to bake four cakes to perfection at one time—to roast meats without need of a covered roaster, or without requiring any attention whatever.

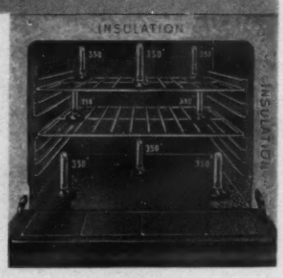
Universal Precision Oven Cooking is time releasing and effort-saving. In all divisions of cookery, in all manner of use, the Universal Gas Range gives a more convenient, simple, certain and economical service. It modernizes the gas service.





Equalator Precision Oven Burner—permits low temperatures of 250 degrees or lower, plus speed in bringing oven to heat.

Controlled temperature plus controlled circulation gives uniform oven heat distribution.



Universal Gas Ranges

MANUFACTURED BY CRIBBEN & SEXTON COMPANY, 700 N. SACRAMENTO BOULEVARD, CHICAGO, ILLINOIS

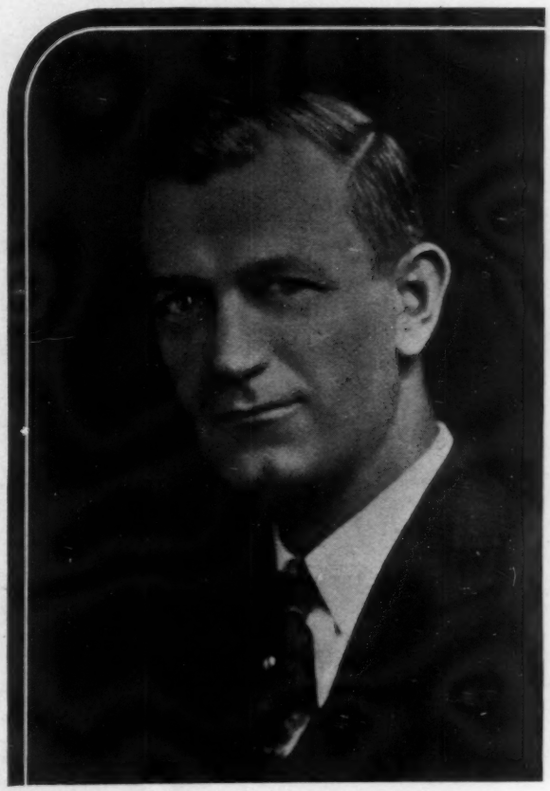
GAS
April, 1937

Guest Editorial

MODERNIZATION

By HUGH H. CUTHRELL

Vice-President in Charge of Sales
The Brooklyn Union Gas Company



TODAY many of our large metropolitan areas are faced with an impending shortage of modern, livable homes and apartments. More and more the substantial citizens in these metropolitan areas are moving to the suburbs. This situation presents a problem to the metropolitan gas company.

In our metropolitan areas there are many well constructed, well located and basically good properties. These are being evacuated by the higher income residents because of the absence of modern equipment. To prevent the deterioration of these evacuated areas efforts must be made to modernize these residences with efficient, automatic equipment. Otherwise these once well-to-do areas will be occupied by lower income groups and will finally become slum areas.

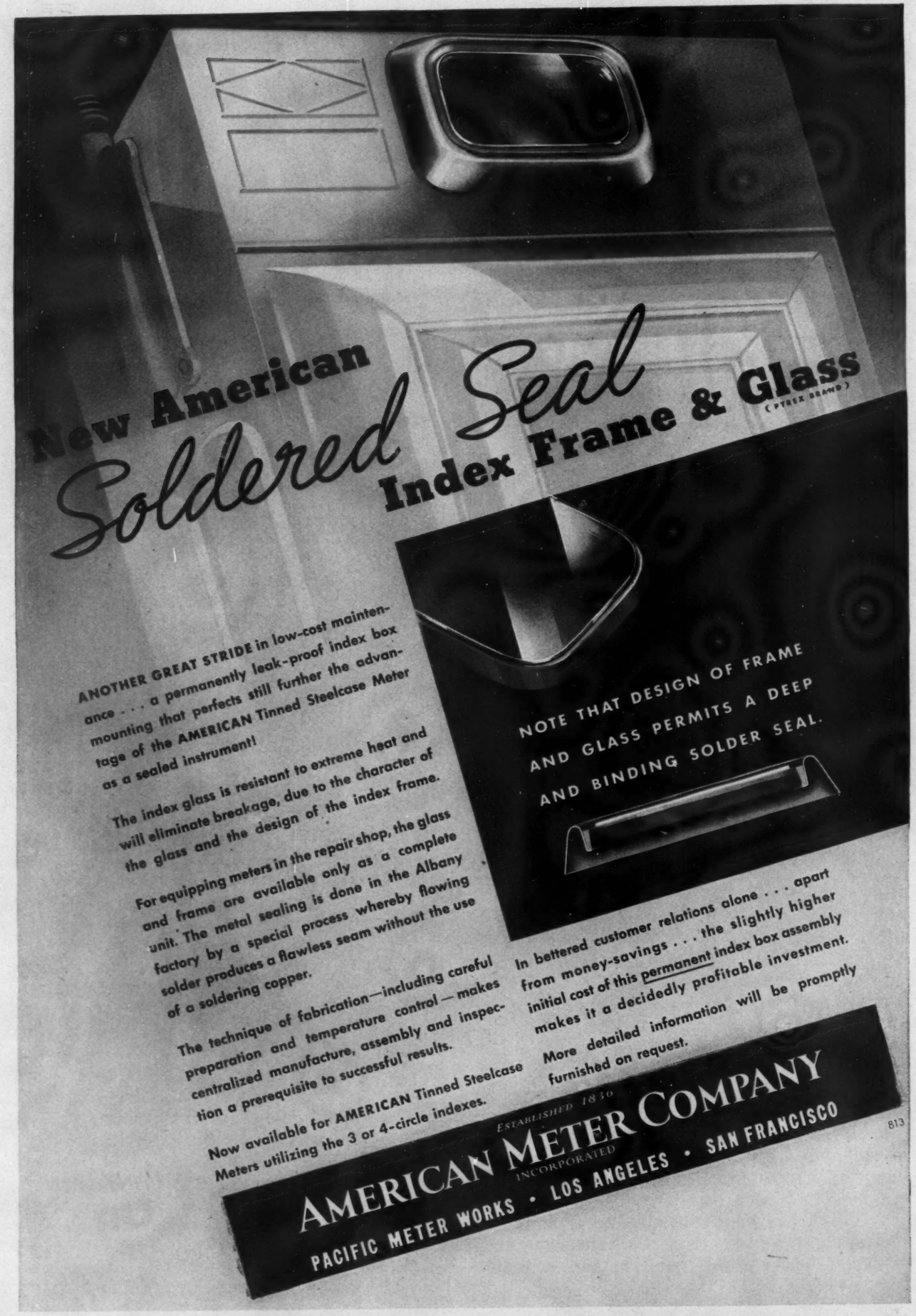
We have seen the results of governmental promotion of slum clearance. Many of the government's low cost housing projects have been completely rented prior to their completion. This fact alone proves the existence of a great need for adequate living facilities.

While the government is actively engaged in promoting slum clearance, gas utilities should endeavor to develop slum prevention. We can do this by not only encouraging but actually cooperating in modernization of many of the residential properties located in our territories.

Small, up-to-date apartments are greatly in demand and easily rented today. Such apartments can be created through modernization in the typical old residential structures. It is being accomplished by the installation of complete automatic gas appliances, including home heating, water heating, refrigeration and cooking. Such promotion, thus, offers to the gas company a splendid field for increased sales of modern gas appliances with the subsequent increase in gas load.

In Brooklyn we have worked out a concise program, stressing the possibilities of modernization through the use of automatic gas appliances. The Brooklyn Union Gas Company has sponsored the conversion of an old single-family residence into an eight-family apartment house. Each apartment is completely equipped with gas appliances under the control of the tenant. Through this experiment we hope to prove the practicability of converting old residences into apartments which are modernized through installation of automatic gas appliances.

The completion of the project will prove its practicability. It will demonstrate to property owners the soundness of similar modernization and rehabilitation by the use of automatic gas appliances. It will provide us with another means of merchandising gas appliances and building up our gas load.



New American Soldered Seal Index Frame & Glass

(PYREX BRAND)

ANOTHER GREAT STRIDE in low-cost maintenance . . . a permanently leak-proof index box mounting that perfects still further the advantage of the AMERICAN Tinned Steelcase Meter as a sealed instrument!

The index glass is resistant to extreme heat and will eliminate breakage, due to the character of the glass and the design of the index frame.

For equipping meters in the repair shop, the glass and frame are available only as a complete unit. The metal sealing is done in the Albany factory by a special process whereby flowing solder produces a flawless seam without the use of a soldering copper.

The technique of fabrication—including careful preparation and temperature control—makes centralized manufacture, assembly and inspection a prerequisite to successful results.

Now available for AMERICAN Tinned Steelcase Meters utilizing the 3 or 4-circle indexes.

NOTE THAT DESIGN OF FRAME AND GLASS PERMITS A DEEP AND BINDING SOLDER SEAL.

In bettered customer relations alone . . . apart from money-savings . . . the slightly higher initial cost of this permanent index box assembly makes it a decidedly profitable investment.

More detailed information will be promptly furnished on request.

ESTABLISHED 1836

AMERICAN METER COMPANY

INCORPORATED

PACIFIC METER WORKS • LOS ANGELES • SAN FRANCISCO

813

April, 1937

GAS

Vol. XIII, No. 4

THIRTEENTH YEAR OF PUBLICATION

LOS ANGELES—810 South Spring Street. . 1064 Peoples Gas Building—CHICAGO

MEMPHIS MEETING HITS NEW HIGH FOR SOUTHERN GAS MEN

By CRAIG ESPY

Mid-Western Manager, GAS

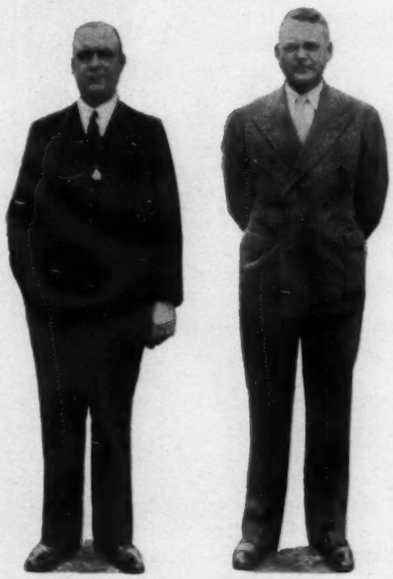
CHESTER L. MAY, vice-president and general manager of Community Natural Gas Co., Dallas, Texas, and incoming president of the Southern Gas Association and Southwestern Gas Sales Conference, seemed to voice the sentiment of more than 300 gas men gathered in Memphis, Tenn., March 10, 11 and 12, when he said upon being inducted into his new office that this year's meeting of the group was the best that had been held since the two organizations combined their activities in 1935. Even though the convention was held a month later than originally planned, due to flood conditions in the South, a record registration resulted and enthusiasm reached a new peak.

Outside speakers contributed greatly to the success of the meeting as did also the splendid program presented by the Home Service group. In introducing this group into the spotlight of the general sessions program, President H. E. Meade, New Orleans Public Service Co., said that the women had well earned their right to the special prominence being accorded them.

So great was the interest expressed in this particular program that the Resolutions Committee later presented a citation complimenting the Home Service group for special achievement in the industry and for the splendid character of their program.

Dr. G. W. Dyer, professor at Vanderbilt University, brought the convention to its climax in his address, "An Economist Looks at the Gas Business." In this address he earnestly proclaimed the place of private initiative in business, saying that this was the secret of success in any business. He objected to the Government's meddling in business and made numerous comparisons between government and private business. "Our system of roads and every other modern invention and convenience we now boast of is the product of individual business men," he said.

William T. Warren of the architectural firm, Warren, Knight, and Davis, of Birmingham, brought the architect's viewpoint in addressing the convention on the subject, "How Gas Companies Can Get the Co-operation of Architects." He showed what other industries are doing to help architects and urged the gas industry to give more consideration to the architect, remembering that he wants to tell his client all the good things that he can pertaining to gas and gas service.



CHESTER L. MAY
Incoming President

H. E. MEADE
Retiring President

Another talk from outside the industry was brought by E. C. Atkinson of the Standard Oil Co. of Memphis. His address on "Selling Service" described the policy of Standard Oil as being that of "merchandising" their service. He showed methods that had been worked out to defray the costs of service, thereby giving it an economic justification. He also related the rigid way his company checks and maintains service.

The program of the Home Service group, presided over by Mildred R. Clark, Oklahoma Natural Gas Co., Tulsa, presented some of the best home service talent in the South and Southwest and drew a larger attendance than any other meeting. The program began with a dramatic presentation of modern gas appliances by Albertine Berry, Lone Star Gas Co., Dallas. Mary Alice Crosson, the Memphis Power & Light Co., also gave a talk under this heading.

Doris McKnight, Oklahoma Natural Gas Co., Enid, addressed the group on "Building Up to a Down Payment." This was followed by "The Knock that Serves and Sells," by Grace Larrabee, Louisiana Power & Light Co., Algiers, La.; "Rolling Wheels Gather Sales," by Margaret Phillips, Memphis Power & Light Co.; and "Twenty Million People Can't Be Wrong," by Margaret

The Home Service group of the Memphis Power & Light Co., Memphis, Tenn.

Marable and Albertine Berry, Lone Star Gas Co., Dallas. The latter was a radio presentation written by Miss Marable and enacted by the author, Miss Berry, and a supporting cast from a well-known radio broadcasting station in Memphis.

The Home Service luncheon followed the Home Service program and drew a record attendance. Miss Clark again presided. Following the luncheon she presented Mrs. Robert Bond, Nashville Gas & Heating Co., on the subject of "Healthful Cookery Demonstrations"; Julia Myers Melton, Birmingham Gas Co., "Using Local Radio Programs to Sell"; Hazel Delaney, United Gas Co., Houston, "Aiding Dealers' Service Problems"; Margaret Thompson, Little Rock Gas & Fuel Co., "Home Calls an Aid to Sales"; Harryette Hunter, Oklahoma Natural Gas Co., Oklahoma City, "The Newspapers an Aid to Customers."

W. H. McINNIS
Elected Second Vice-President

At the close of the luncheon Hazel Delaney, United Gas Co., Houston, was elected chairman of the group for the coming year.

One paper on the general sessions program and one on the Gas Sales Conference program dealt with the subject of national advertising. The first of these was presented by Arthur Kelly, Rochester Gas & Electric Corp., who addressed the group on the "Scope of the National Advertising Program." W. G. Wiegel, advertising manager of Lone Star Gas Co. and a member of the national committee an advertising copy, later spoke on "The National Advertising Campaign—So What!"

H. G. BONNER
Elected First Vice-President

Househeating had its place on the program with a skit by two Dallas Gas Co. representatives and a paper by W. H. McInnis, Memphis Power & Light Co., on "Applications and Trends of Modern House Heating." The skit, with great skill, represented an actual house heating sales demonstration.

"Developments to Date in General Air Conditioning and Ice Making Equipment" were discussed by O. A. Kinzer of Dallas Gas Co. and Carl Dean, Oklahoma Natural Gas Co., Tulsa. Open forum discussion followed the reading of these papers and was participated in by gas men and manufacturers of conditioning equipment. A larger group attended this meeting than in any previous year.

Addresses on "Modern Kitchen Promotion," "Gas Business in the South — Where To?" "Domestic Gas Refrigeration," and "Dramatizing Modern Gas Cookery" were also given before the conference. These addresses were delivered by W. E. Leverette, Nashville Gas & Heating Co.; Harry Wrench, Jacksonville Gas Co.; Louis Ruthenburg, Servel, Inc., Evansville, Ind.; and Paul Dorsey, Cribben & Sexton Co., Chicago.

W. E. LEVERETTE
Sales Conference Chairman

A technical session was held simultaneously with the Gas Sales Conference program on the first day of the conference and an industrial and commercial forum, at the same time as the Sales Conference on the last day. B. H. Elliott of Birmingham Gas Co. presided over the first meeting and L. H. Hungate of Memphis Power & Light Co. presided over the industrial and commercial forum.

Jeff Collins, New Orleans Public Service Co., was presented at the technical section on the subject, "Education of Service Employees." Following an open forum discussion, A. H. Mills, Knoxville Gas Co., dealt with the subject, "Handling High Pressure Changes without Interruption to Service."

The industrial and commercial forum presented A. B. Banowsky, United Gas Public Service Co., Houston, in a paper entitled "New and Unusual Industrial and Commercial Installations in the South." L. S. Reagan, The Webster Engineering Co., Tulsa, read a paper on "Recent Improvements in Industrial and Commercial Burner Equipment." The following subjects were discussed on this program: "Gas Engine Uses and Operating Problems," George I. Morris, National Transit Co.; "Correct De-Humidification Control on Gas Engine Powered Air Conditioning Jobs," C. A. McKinney, United Gas Public Service Co.; "Utilizing Gas Under Low Pressure Heating Boilers," F. L. Laseter,

(Continued on Page 71)

TESTING AND APPRAISING LARGE VOLUME WATER HEATING INSTALLATIONS

By J. LOUIS OBERSEIDER

Los Angeles Gas and Electric Corporation*

THE large volume water heating field includes all types of buildings larger than the private residence, the predominant type being the apartment house. One gas company reports that apartment houses provide a water heating load amounting to 4 to 5 per cent of the gross gas revenue. The growth and continuance of this revenue are based on a knowledge of water heating installations. This report describes a test procedure that was successfully used in the field to obtain such knowledge, and indicates the way in which this knowledge can be put to use. The tests are quite complete, providing information for every phase of the growth and continuance of volume water heating by gas; i.e., determination of potential market, competitive rate, proper equipment, method of installation, and the handling of consumer complaints. Such tests may be modified to meet any requirements.

J. L. OBERSEIDER

*Excerpts from a paper, "Testing and Appraising Large Volume Water Heating Installations," presented at the Spring Technical Conference of the Pacific Coast Gas Association, March 18-19, 1937, Los Angeles, Calif.

Testing Large Volume Water Heating Installations

The amount of equipment necessary for conducting field tests will vary, depending upon the type of installation. Instruments, sufficient for testing any type of system, together with pertinent data concerning them, are listed in Table No. 1, opposite the variable that they measure.

The instrumentation of a water heating unit is best accomplished by:

1. Contacting the owner and manager to obtain permission to make the test, to agree upon a time for installing the instruments that will cause the tenants a minimum of inconvenience, and to choose a plumber to do the necessary pipe fitting.

2. Making a survey of the water heating system to determine what variables should be measured to give the desired information, and where the instruments used to measure them should be located.

3. Making a sketch (see Fig. 1) of the water heating system from which the plumber, with the aid of the test engineer, can install the instruments.

4. Carefully calibrating all instruments.

Tests are started by reading all indicating instruments and starting all recorders. Recorder charts are changed daily and daily readings of indicating instruments are recorded on a data sheet. Faucet temperatures, taken on each floor, are obtained during the test.

Drafts are measured at the inlet and outlet of the draft hood and at other significant points. Flue gas samples, drawn from a point just beyond the last active heating surface, are analyzed several times during the testing period.

Heater surface temperatures are taken at various points with a portable surface temperature pyrometer. These temperatures are used to estimate the radiation loss from the heater.

Water samples are taken from the cold water supply, heater and hot water supply, and their hardness determined by the soap method. Tests are run for at least one week, and calculations made from each day's data.

Daily gas consumptions, obtained from differences in meter readings are checked against those recorded on the demand meter chart.

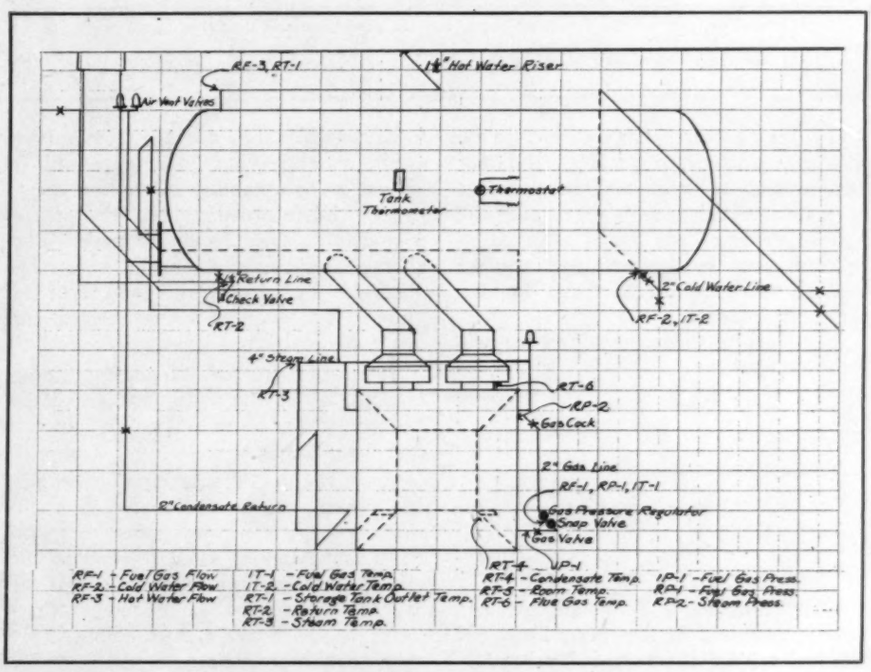


Fig. 1. Typical location of test instruments.

TABLE NO. 1. EQUIPMENT FOR TESTING LARGE VOLUME WATER HEATING INSTALLATIONS

Variable	Equipment	Range or Size
Flow		
Fuel Gas	Recording Demand Meter Maryland Type	(1)
Cold Water Entering System	Trident Recording Register	¾ in. to 1 in.
Hot Water Leaving Storage Tank	Neptune Disc Hot Water Meter	1¼ in.
Temperature		
Fuel Gas	Angle Steam Crescent Industrial Thermometer	(2) 30 to 230°F.
Cold Water	Angle Steam Crescent Industrial Thermometer	30 to 230°F.
Storage Tank Outlet	Gas Filled Recording Thermometer	40 to 200°F.
Return	Gas Filled Recording Thermometer	40 to 140°F.
Heater Inlet	Gas Filled Recording Thermometer	50 to 150°F.
Heater Outlet	Gas Filled Recording Thermometer	40 to 250°F.
Coil Inlet	Gas Filled Recording Thermometer	40 to 250°F.
Coil Outlet	Gas Filled Recording Thermometer	40 to 225°F.
Room	Gas Filled Recording Thermometer	30 to 130°F.
Flue Gas	Gas Filled Recording	50 to 800°F.
Heater Jacket	Portable Pyrometer	0 to 500°F. or 0 to 1000°F.
Pressure		
Fuel Gas	Pressure Recorder	0 to 24 in. water
Steam	Pressure Recorder	0 to 80 in. water press. 0 to 20 in. water vac.
Draft	Ellison Draft Gage	0 to 8 in. water
Composition		
Water Hardness	Soap Method	
Flue Gas	Orsat Gas Analysis Apparatus	
Combustion Air-Humidity	Tag. Dew Point Apparatus	

(1) Sized the same as tinned steelcase meters and the size chosen will depend upon the gas burning capacity of the heater.
(2) Any range desired may be obtained.

Gas temperatures are assumed to be constant, since snap readings did not introduce an error of over 1.5 per cent in the corrected gas volume, and the heating value of the gas is assumed to be equivalent to the weighted average heating value of the send-out for the period in question.

The total heat into the system is given by the equation:

$$Q = V\ F\ H$$

Where

Q = total heat in B.t.u.

V = gas volume as metered, cu. ft.

F = correction factor.

H = heating value, B.t.u. per cu. ft.

Daily hot water demands, obtained from differences in meter readings, are checked against the recorded values.

Cold water temperatures are assumed to be constant. The average temperature of the water leaving the storage tank is arrived at by obtaining a weighted average of the recorded values when there is a definite flow from the tank. The average temperature of the return is obtained by averaging the recorded values. The average temperature of the hot water delivered is assumed:

1. In the case of circulating piping systems, to be the arithmetical average of the storage tank outlet and return line temperatures.

2. In the case of non-circulating piping systems, to be the corrected arithmetical average of the faucet temperatures that bear the same relation to the average storage tank temperature, as the average of the actual faucet temperatures bears to the storage tank temperature taken at the same time.

The heat out in the hot water delivered at the faucet is given by the equation:

$$q_{H.W.} = G\ p\ (t_2 - t_1)$$

where

$q_{H.W.}$ = heat out as hot water delivered, B.t.u.

G = hot water delivered, gallons.

t_2 = temperature of hot water delivered, °F.

t_1 = temperature of cold water, °F.

p = density of the metered water, pounds per gallon.

Excess air and stack losses are determined from flue gas analyses, flue gas temperatures and combustion charts.

The average temperature of the flue gas is arrived at by obtaining the weighted average of the recorded values when the burners are on.

The heat leaving the storage tank is given by the equation:

$$q_s = S\ p\ (t_3 - t_1)$$

where

q_s = heat leaving the storage tank, B.t.u.

S = water leaving the storage tank, gallons.

t_3 = temperature of water leaving the storage tank, °F.

t_1 = temperature of cold water, °F.

p = density of the water as metered, pounds per gallon.

The return is the difference between the weight of water leaving the storage tank and that delivered at the faucets.

The heat returning to the storage tank is given by the equation:

$$q_r = R\ (t_4 - t_1)$$

where

q_r = heat returning to the storage tank, B.t.u.

R = return, pounds.

t_4 = temperature of the return, °F.

t_1 = temperature of cold water, °F.

The heat leaving the storage tank is distributed in three ways:

1. In the hot water drawn from the faucets (see above).

2. In the return (see above).

3. From the piping. This quantity of heat is obtained by difference.

The heat lost from the storage tank is obtained from the area of the exposed surface, the average temperature of the storage tank, the average room temperature and the curves in Fig. 2.

The heat lost from the heater is estimated from surface temperature, areas and a figure of 2 B.t.u. per sq. ft. per °F. This quantity is compared with that obtained from the manufacturer, if possible, and the optimum figure chosen.

The standby loss, i.e., the heat lost during the time the heater is off, is obtained by difference, and for a given installation depends on the total time

(Continued on Page 52)

TABLE NO. 2. WATER HEATING SURVEY DATA FROM LOS ANGELES AND VICINITY

Job No.	No. of Apartments	No. of Vacancies	No. of Occupants		No. of Hot Water Outlets	Temperature °F.		Temp. Rise °F.	Daily Hot Water Demand Gallons		Average Daily Estimated Demand 100°F. Rise*	Average Daily 100°F. Rise Gallons per		
			100% Occupancy	During Test		Inlet	Outlet		As Metered	100°F. Rise 100% Occupancy		Person	Fixture	Apartment
1A	30 2-rm.	0	60	59	122	66	122	56	1220	695	1680	11.8	5.7	23.2
2A	2 2-rm.													
	43 3-rm.	4	....	....	183	63	125	62	1525	1038	2864	....	5.7	23.1
3A	3 1-rm.													
	70 2-rm.													
	20 3-rm.	43	223	84	372	65	124	59	1106	1735	5344	20.6	4.7	38.5
4A	5 hotel-rm.													
	32 2-rm.													
	15 3-rm.	52	129	100	152	73	120	47	1493	905	2990	9.1	6.0	17.4
5A	20 2-rm.													
	2 3-rm.													
	1 4-rm.	5	....	....	72	77	109	32	840	303	1320	....	4.2	13.2
6A	82	22	164	120	....	74	118	44	2550	1530	....	12.8	....	18.7
7A	40	5	80	60	....	74	111	37	1261	622	....	10.4	....	15.5
8A	10 1-rm.													
	30 2-rm.													
	10 3-rm.	6	110	125-130	236	77	127	50	2530	1100	2800	10.0	4.7	22.0
9A	12	0	24	19	40	79	132	53	627	420	....	17.5	10.5	35.0
10A	52 2-rm.	10	104	80	161	76	129	53	1490	1027	2910	9.9	6.4	19.8
11A	33 2-rm.													
	7 3-rm.	2	94	70	....	65	133	68	1760	1609	2300	23.0	....	40.2
1C	37 2-rm.													
	23 3-rm.	9	166	102	186	69	138	69	2300	2580	3540	15.6	13.9	43.0
2C	2 6-rm.													
	1 5-rm.													
	14 4-rm.													
	44 3-rm.													
	20 1-rm.	5	....	....	315	76	128	52	2727	1510	5050	....	4.8	18.6
3C	105 2-rm.	..	210	52	340	71	133	62	1924	4840	5880	23.0	14.2	46.1
4C	8 2-rm.													
	8 3-rm.	0	48	31	68	62	113	51	743	586	960	18.9	8.6	36.6
5C	29 2-rm.													
	8 3-rm.	0	90	73	113	59	123	64	1866	1480	2140	20.3	13.1	40.0
	Averages							54				15.6	7.9	28.2

Note: Month test run: 1A, 2A, 3A-May; 4A, 5A-June; 7A, 8A-July; 6A, 9A-August; 10A-October; 11A-December. 1C-May; 2C-October; 3C, 4C-November; 5C-December.
One bath per apartment in all cases. *American Gas Association method.

Skyline of Kansas City, scene of the forthcoming Natural Gas Department Convention.

Diversified Program Announced For Kansas City Natural Gas Meeting

By CHAS. D. GREASON

Chairman, Publicity Committee
Natural Gas Department Convention

BUSINESS session programs, entertainment, all details, in fact everything has been completed for this year's Natural Gas Department convention which is on the natural gas man's calendar only a month hence. The convention is scheduled to get under way in Kansas City Sunday afternoon, May 10, with the official opening of the exhibit and close with the sound of the gavel at the last general session meeting, Friday noon, May 15.

Captain A. E. Higgins, who has resigned his position as secretary of the Natural Gas Department, but who is serving in this capacity until after the convention, has announced a complete list of speakers and subjects to be discussed for the general session programs, all of which are scheduled to be held each morning during the week with the exception of the opening session program to be held Monday afternoon. All subjects have been assigned and practically all speakers who will appear on the sectional programs in the afternoons have accepted. There is no question but what this year's program, with so many varied subjects, will have a great appeal to natural gas men the country over.

Much time has been given by both the men's and women's entertainment committee chairmen and their committees to plan entertainment programs that will appeal to all visiting natural gas men and women.

The women's entertainment program is being handled by Mrs. B. C. Adams, wife of the general manager of The Gas Service Co., who has planned delightful programs for two afternoons during the convention.

On Tuesday afternoon, May 12, the visiting ladies will be taken on a sight seeing trip of Kansas City in buses. The trip will end at the William Rockhill Nelson gallery of art, where the women will have an opportunity to see one of the world's most famous art collections. Tea will be served that afternoon at the art gallery.

A bridge luncheon is on the program of the ladies on Wednesday afternoon. This will be held at the beautiful Kansas City Country Club.

Paul C. Ford, of the Kansas City Gas Co., chairman of the men's entertainment committee, announces two out-

standing events — a stag smoker and athletic show on Tuesday night, May 12, and the annual department banquet and dance for both men and women to be held on Wednesday night, May 13.

The stag smoker and athletic show will be held at the Ararat Temple, Eleventh and Central streets, beginning at 9 P. M. Refreshments will be sreved at the close of the athletic show.

One of the most elaborate stage shows ever presented at a Natural Gas convention has been booked for the annual banquet and dance on Wednesday night. This affair, always the high spot of the entertainment program, will be held in the Arena of Kansas City's new Municipal Auditorium. The tables will be set up in night club fashion with an orchestra playing during the meal for dancing between courses. Following the serving of the banquet, the floor show composed of "all-star" acts will be held and after that the entire floor will be cleared for dancing.

Captain Higgins has announced that the annual Management committee dinner will be held at the Hotel Muehlebach Trianon Cafe on Monday night, May 11, beginning at 7 P. M. The dinner will be preceded by the annual meeting of this committee to be held in the Muehlebach in Room 4 on the mezzanine floor.

An exceptionally interesting program for both the general sessions and the sectional meetings has been arranged by the combined program committee. Committee meetings will be held during the morning of May 10. The tentative program follows:

GENERAL SESSIONS

MONDAY AFTERNOON
MAY 10, 1937

Opening Remarks by the Chairman — George E. Welker, United Natural Gas Co., Oil City, Pa.

Invocation—Dr. Burris A. Jenkins, Pastor, Community Church, Kansas City.

Address of Welcome — Bryce B. Smith, Mayor of Kansas City.

G. E. WELKER

H. C. COOPER

MAJOR FORWARD

A. E. HIGGINS

Address—Herman Russell, President, American Gas Association.

Address—Alexander Forward, Managing Director, American Gas Association.

Economic Trends in the Consumption of Natural Gas—Dr. John W. Finch, Director, United States Bureau of Mines, Washington, D. C.

In Memoriam—W. C. Grant, Director of Public Relations, Lone Star Gas Co., Dallas, Texas.

Appointment of Committee on Final Resolutions—George E. Welker, United Natural Gas Co., Oil City, Pa.

TUESDAY MORNING
MAY 11, 1937

H. C. COOPER, Chairman

Report of Main Technical and Research Committee.

Report of Gas Measurement Sub-Committee.

Report of Pipe Line Sub-Committee.

Report of Gas Well Deliveries Sub-Committee.

Address—By speaker to be announced later.

TUESDAY AFTERNOON
MAY 11, 1937

Tuesday afternoon is being left open so the delegates will have an opportunity to visit the Exhibit.

WEDNESDAY MORNING
MAY 12, 1937

Report of Supply Men's Fund Committee—George E. Welker, Chairman, United Natural Gas Co.

Removal of Hydrate Formations by use of Anhydrous Ammonia—J. T. Russell, Panhandle Eastern Pipe Line Co., Liberal, Kan.

Discussion—W. M. Deaton, United States Bureau of Mines, Amarillo, Texas.

Future Plans for the National Advertising Program—T. J. Strickler, Kansas City Gas Co., Kansas City, Mo.

Geophysics — Dr. K. C. Heald, Gulf Oil Company, Pittsburgh, Pa.

Discussion—Dr. B. B. Weatherby, Geophysical Co. of America, Tulsa, Okla.

Natural Gas Extension Courses—Professor C. M. Young, University of Kansas, Lawrence, Kan.

THURSDAY MORNING
MAY 13, 1937

Report of Wrinkle Committee—John H. Shalek, Chairman, Peoples Natural Gas Co., Pittsburgh, Pa.

Maintaining High Efficiencies in Pipe Lines—J. C. Reinbold, Panhandle Eastern Pipe Line Co., Kansas City, Mo.

Discussion—J. L. Foster, Lone Star Gas Co., Dallas, Texas. J. W. Furgeson, Colorado Interstate Gas Co., Colorado Springs, Colo.

Sales Objectives—Domestic and Industrial —W. W. Winter, Atlanta Gas Light Co., Atlanta, Ga., or F. M. Banks, Southern California Gas Co., Los Angeles, Calif.

Latest Developments in Well Control and Operation for Preservation of Reserves—E. L. Rawlins, United Gas Public Service Co., Houston, Texas.

Discussion—J. H. Dunn, Lone Star Gas Co., Dallas, Texas.

FRIDAY MORNING
MAY 14, 1937

Personal Appearance

Mystery Chef and Little Barbara Jenkins.

Report of Committee on Final Resolutions.

Closing Remarks and Adjournment.

PARALLEL SESSIONS

NATURAL GAS PRODUCTION

WEDNESDAY AFTERNOON
MAY 12, 1937

B. M. NOWERY, Chairman

Drilling Equipment Improvements and Changes—W. W. Scott, Humble Oil Co.

Discussion—H. P. George, Southern California Gas Co., Los Angeles, Calif.

Increasing the Flow from Small Producing Gas Wells—Speaker to be secured by S. W. Meals, Carnegie Natural Gas Co., Pittsburgh, Pa.

Prolongation of the Life of Wells—L. A. Farmer, Oklahoma Natural Gas Co., Tulsa, Okla.

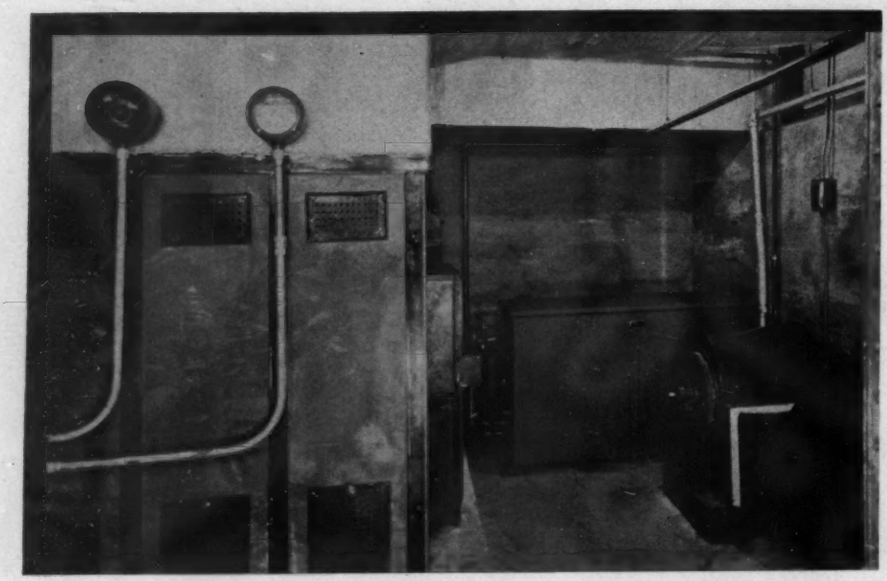
(Continued on Page 80)

F. M. BANKS

F. W. TREMBLY

F. F. DOYLE

B. M. NOWERY



● **Excellent air conditioning results were obtained from this installation in a Dallas residence. A 7-ton gas engine compressor unit is used to care for a calculated 6-ton load.**

SUMMER Air Conditioning With Gas

By O. A. KINZER

The Dallas Gas Company*

QUESTIONS on the subject of "Experiences and Trends in Summer Air Conditioning with Gas" can be answered very simply by the statement that the air conditioning business is increasing very rapidly and that the installations using gas have been far too few. However, the gas installations that have been made are very encouraging and show a decided trend to use gas engines for air conditioning in the Southern States where natural gas is available.

The electrical industry pioneered air conditioning and spent millions of dollars in educational advertising to get just one thing—the electrical motor power load. A belief has been created that power and electricity are one and the same thing, and that the only way to produce power is with an electric motor. Believe it or not, a great many gas companies hold the same thought. I do not believe the gas industry as a whole realizes that in the automotive type gasoline engine, using natural gas as a fuel, there is a source of power not only equal to any electrical motor, but far superior to it in flexibility of speed and in most cases cost of operation. The gas engine for power purposes has proved to be both efficient and economically sound. For instance, in the city of Dallas, alone, we have over 12,000 horsepower of gas engines in use with a consumption of over 300,000,000 cu. ft. of gas per year. It is no longer experimental; it is a tool waiting for the gas industry to use in the air conditioning field for the building of a badly needed summer load.

The Texas Centennial offered an excellent opportunity to install and test out gas air conditioning equipment. The Dallas Gas Co. installed in the Masonite Model Home, to care for a calculated 11-ton load, a combination of a 7-ton Waukesha gas engine compressor unit and a 4-ton Bryant Silica-Gel dehumidifying unit. Excellent air conditioning results were obtained. In the Contemporary Model Home, to care for a calculated 13-ton load, two 7-ton Waukesha gas engine compressor units were used. Excellent results were obtained on all but the hottest days. Failure to give perfect service in extreme weather was due to the load being closer to 20 tons since the builder failed to insulate the house as originally planned.

A private residence in Dallas was equipped with one 7-ton Waukesha gas engine compressor unit to care for a calculated 6-ton load. Very excellent air conditioning results were obtained.

On all four of the gas engine compressor units used, we experienced some mechanical trouble such as sticking of the compressor main bearing, breaking of the compressor shaft spider, breaking of gas engine valve springs, excessive use of battery water, and ignition wiring trouble. The engine company cooperated to the limit in correcting these mechanical difficulties. It must be remembered that it is only in actual field service that equipment can be perfected. One gas engine company, in view of last year's experience, is offering this year in addition to the 7-ton gas engine and compressor unit three automatic gas engine units, self contained, in sound proof cabinets with extended power shafts and in capacity 21, 42, and 72 hp.

The Hall of Religion at the Texas Centennial, a $75,000 building erected by the stockholders of the Lone Star Gas System, was equipped with a 54 hp. National Transit Co. gas engine direct connected to a Type 7G8 Carrier Compressor to take care of a calculated 40-ton air conditioning load. An outstanding feature of this installation was the automatic control of the speed of the gas engine varying in speed with the suction pressure, producing continuous operation of the engine at a speed proportioned to care for the load at that particular time. The perfect air conditioning results obtained could not have been secured, it is believed, with a constant speed motor operating intermittently. It is also interesting to note that two identical 54 hp. National Transit Co. gas engines were used connected to generators to supply electricity to the building.

On the basis of Dallas electric rates and the Dallas Gas Co. Industrial Class I gas engine rate and 86c per gallon for oil, the minimum cost of electricity would have been $736.75 and gas and oil $225.00, a saving of $511.75 per summer.

The cost to a customer for the gas engine would have been $2,300.00, and

*Presented before the Southern Gas Association and Southwestern Gas Sales Conference, Memphis, Tenn., March 10, 11, and 12.

"THE DITCHER SURE HAS TO 'STEP ON IT'- WHEN IT'S A DRESSER-COUPLED LINE"

Faster than the ditcher itself can travel—that's how fast a Dresser-coupled line is laid! On a recent 42" line, for instance, trenching often held up a laying crew of only ten men. • With Dressers, no long lengths of trench need be kept open, nor is there any "lag" between operations. Such confinement of all the work to a small area, moreover, permits better supervision. • Best of all, this speed is with a joint whose permanent tightness and flexibility have been proved for 50 years!

Note to Reader:
This is the second in a series of advertisements dramatizing one engineer's experience with his first Dresser-coupled line. For the complete story, write for Bulletin 351.

S. R. DRESSER MFG. COMPANY, BRADFORD, PA.

In Canada: Dresser Mfg. Company, Ltd., 60 Front Street, West, Toronto, Ontario

the cost of a 50 hp. electric motor $800.00. The $1,500.00 additional first cost of the gas engine effected a saving of $511.75 or a return of 34 per cent per year on the additional investment.

In territories served by manufactured gas at relatively high rates compared to natural gas, gas engine power probably will not compare as favorably as a cost factor. In these territories dehumidification equipment such as Silica-Gel with evaporation and well water cooling offers possibilities. The particular locality and problem will determine the type of equipment necessary.

It is easily possible that in a few years air conditioning will be one of our leading industries. The installations today are just a start. If we want our rightful share of the future air conditioning market, we must get into it now.

The gas air conditioning installations in the territory comprising the Southern Gas Association include four Silica-Gel installations in Washington, D. C., and Dallas, Texas. Many more installations have been made that have not been recorded. Practically all of the gas engine and Silica-Gel installations are experimental to the extent that they are being carefully watched and are being used to gain vital information.

I want to call particular attention to the gas dehumidification equipment perfected and available to the gas industry. In several instances where cool water is available, this is the only type required. In most of our southern states, however, cool water is not available and some compression refrigeration must be used with the dehumidification equipment. The question of whether the entire job should be done by compression refrigeration or a combination of compression refrigeration and dehumidification must be determined by the particular humidity load of the problem and the economies of equipment. Gas dehumidification provides an excellent addition to compression refrigeration equipment that is under capacity. Also gas dehumidification equipment has an almost exclusive market in certain industrial and processing work demanding low relative humidity without requiring low temperature.

The manufacturers of gas engines, gas dehumidification equipment and automatic controls are eager and ready to supply the demands of the gas industry. Our efforts should be directed toward an immediate survey of the air conditioning market, passing on to these manufacturers information as to the particular type and capacity of the equipment needed for specific installations.

But before we get into a detailed discussion of individual problems and the building of an air conditioning load, let us analyze our general problem, clarify it, and find our real objectives. The use of gas in air conditioning has too long been confused with the problems of air conditioning itself. I venture to say that many good sound air conditioning programs have been turned down by the management because of a lack of understanding of the technical problems of air conditioning with its confusion of wet bulb, dry bulb, effective temperatures, air motion, amount of fresh air necessary, and other individual factors of each individual installation. The lack of understanding on the part of the management, lack of experienced air conditioning engineers on the utility staff devoting their entire time to air conditioning, and general confusion as to what is proper air conditioning have held back the gas industry from engaging in this lucrative business. It has been a confusing problem.

Let me suggest that the gas company concentrate on supplying power for air conditioning and limit its responsibility at the power shaft of the gas engine.

For our first objective, let me suggest that we offer complete and helpful cooperation instead of competition with all legitimate and responsible air conditioning firms, assisting them in securing low operating cost through gas engine power service. Let us remember that air conditioning firms are not interested in whether an electric motor or a gas engine produces the necessary power, but that they are tremendously interested in a source of power that will cut operating cost in natural gas territories to one-fourth or one-third the present cost of electrical energy. A lowered power cost immediately opens up to them a vast market of small commercial establishments that can afford to install air conditioning, but that cannot afford high power cost as an operating expense. We have a service they need, and we need the load they can build for us.

In air conditioning work, service must be continuous without breakdowns. I suggest then for a second objective that we provide a gas engine power service that is as dependable as any other service and one where the only cause for failure would be a shutdown of the gas supply. This is easily possible with a service organization of good engine mechanics and a system of thorough periodic inspections. Trouble must be discovered before it happens. The air transport business is an example of the use of internal combustion engines where adequate servicing makes engine failure almost an unknown thing. We are fortunate in the economy of gas as a power fuel in that we do not have to offer an inducement rate. In most cases the residential or gas engine industrial rate is an economical rate for this service and will warrant, in most cases, the expense of providing a free inspection and adjustment service to the gas engine user.

Our third and last objective is that we immediately attack the air conditioning market by encouraging the sale of automatic gas engines for commercial and industrial air conditioning installations. This should be our first point of attack, for by so doing we can prove economical operation compared to other sources of power, and prove an equally dependable continuity of service. As we prove our superiority in this field, new installations will be demanding gas power installations. The residential air conditioning business will follow commercial practice, and is a field in which we should dominate by virtue of low operating cost, compared to the cost of providing three-phase electrical power service to a residential area.

Keeping these three objectives in mind —complete cooperation with air conditioning dealers—providing dependable, uninterrupted gas engine service—immediately attacking the existing air conditioning market with gas engines, we can gain an entirely new lucrative market for our fuel.

Calendar

April

Pacific Coast Gas Association—Sales and Advertising Section Spring Sales Conference, Auditorium of the Los Angeles Gas & Electric Corp., Los Angeles, Calif., April 1-2.

National Bottled Gas Association, Midwest Section—Cedar Rapids, Iowa, April 2.

American Gas Association, Distribution Conference—Washington, D. C., April 12-14.

Mid-West Gas Association—32nd annual convention, Waterloo, Iowa, April 12-14.

Missouri Association of Public Utilities—Elms Hotel, Excelsior Springs, Mo., April 21-23.

Indiana Gas Association — Hotel Roberts, Muncie, Ind., April 28-29.

May

Pennsylvania Gas Association — Sky Top Lodge, Sky Top, Pa., May 4-6.

American Gas Association, Natural Gas Department—Civic Auditorium, Kansas City, Mo., May 10-15.

American Gas Association, Production and Chemical Conference—New York City, N. Y., May 24-26.

June

American Gas Association, Industrial Gas Section — Industrial Gas Sales Conference, Chicago, Ill., June 8-9.

Canadian Gas Association — 30th Annual Convention, Chateau Laurier Hotel, Ottawa, Canada, June 10-11.

American Society of Heating and Ventilation Engineers — New Ocean House, Swampscott, Mass., June 24-26.

Pacific Coast Gas Association — Northwest Conference, Seattle, Wash., June 25-26.

July

Michigan Gas Association — Grand Hotel, Mackinac Island, Mich., July 1-3.

September

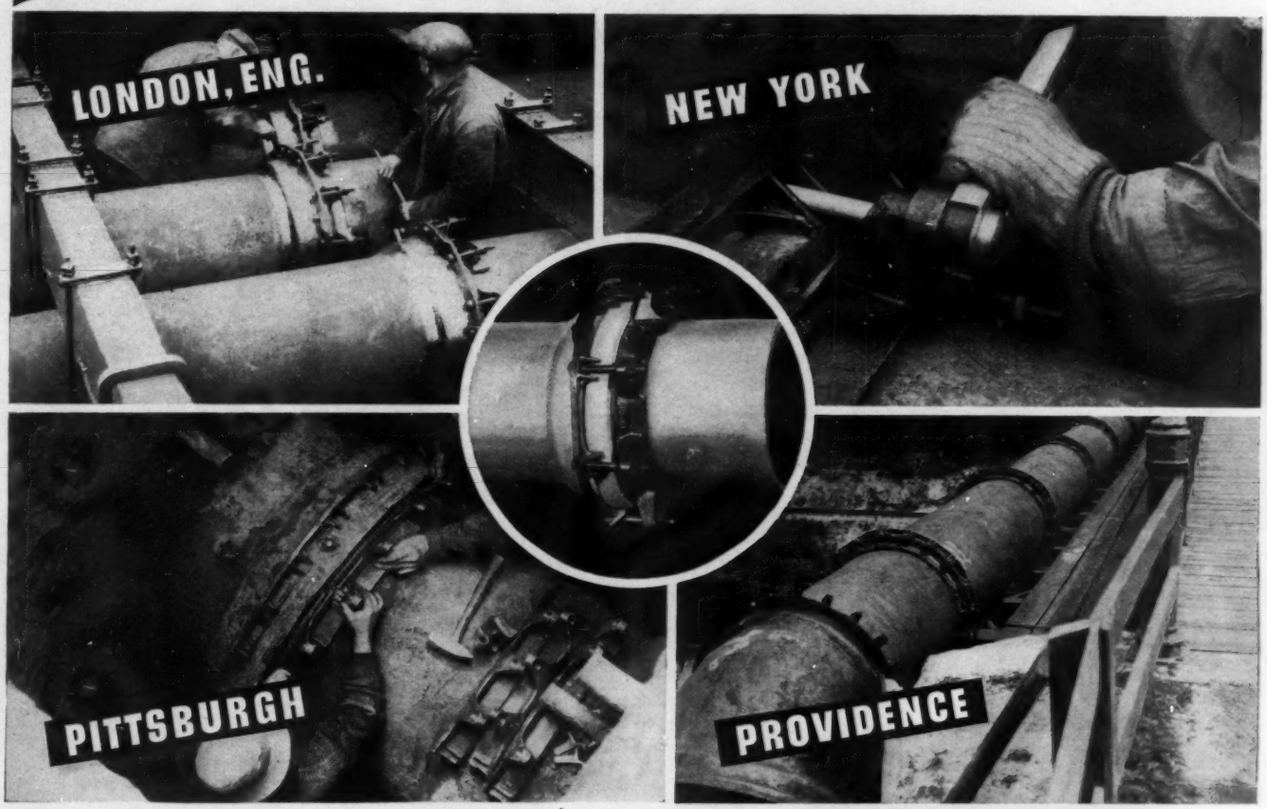
American Gas Association—Cleveland, Ohio, week of September 27.

October

American Society for Metals—1937 Metal Congress and Exposition, Atlantic City Auditorium, Atlantic City, N. J., October 18-21.

Six Pictures

AND THE STORY THEY TELL



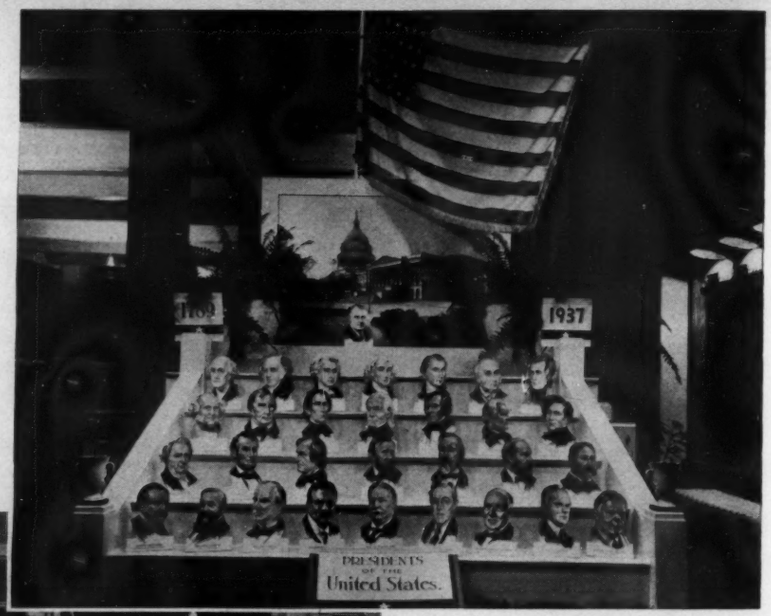
On this page you see six pictures—five of them views from large cities, and the sixth a Dresser product. • The story they tell is simply this. Major cities, with engineering staffs and standardized practices, test carefully, check thoroughly before buying. Thus, any product that wins their approval has to be good. • Dresser Style 60 Clamps have been tested and "O.K.'d" by city engineering departments practically everywhere. Send for folder No. 3612-G today.

DRESSER BELL JOINT CLAMPS *Style 60*

S. R. DRESSER MFG. COMPANY, BRADFORD, PA. *In Canada:* Dresser Mfg. Company, Ltd., 60 Front St., W., Toronto, Ont.

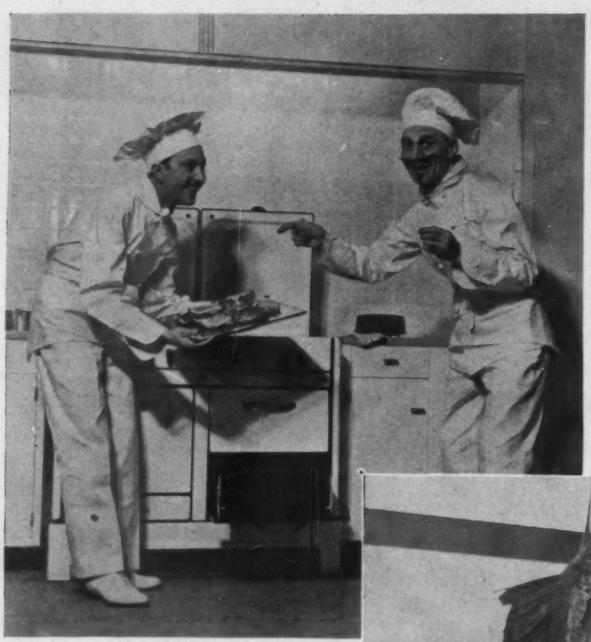
GAS CAMERA

WHITE AND Streamlined, the gas display car of the Chattanooga Gas Co. played an important part in publicizing gas during recent sales campaigns.



THE PRESIDENTS of the United States in the above impressive display brought many people to this window at the Luzerne County Gas and Electric Co., Kingston, Pa.

FOUR LITTLE girls of Ware, Mass., listened to the Mystery Chef, promptly baked four perfect cakes. Manager George Oliver of the Ware Gas Co. used the cakes in an attractive window display.



COMIC COOKERY was a feature of The Peoples Gas Light and Coke Co.'s recent two-weeks' Cooking Carnival in Chicago.

H. T. EAST, assistant to the vice-president of Public Service Co. of Northern Illinois, holds a big one by the tail. Between fish hides his nephew.

STUDENTS in the high school at Sebastapol, Calif., learn the advantages of gas cookery on these recently installed Wedgewood ranges.

From Tanks of NON-RUST EVERDUR METAL

THE PUBLIC GETS: Clean, rust-free hot water indefinitely . . . Complete freedom from rust expense . . . Longer service and better value

THE UTILITY GETS: Steadier gas consumption . . . Freedom from constant servicing . . . More satisfied customers

EVERDUR METAL *cannot* rust. And this explains why tanks of this strong copper-silicon alloy are more satisfactory not only to the public . . . but to the utility as well.

For the buyer . . . an Everdur tank provides the assurance of clean, *rust-free* hot water indefinitely. It marks the end of all tank repair and replacement costs due to rust.

From the standpoint of the utility . . . Everdur tanks are profit-makers. Rust and rust-repairs never interfere with the steady consumption of gas. Everdur tanks require far less servicing. They may be sold with complete assurance that their reliable performance will satisfy customers. They can be guaranteed against tank failure through corrosion. They provide a sound basis for longer-term payment plans.

Because it is absolutely immune to rust, durable, easily welded and strong-as-steel . . . no less than 24 leading manufacturers of automatic gas storage water heaters now standardize on Everdur Tanks for rust-proof models. 36123

ANACONDA

EVERDUR METAL

"Everdur" is a registered trade-mark, identifying products of The American Brass Company made from alloys of copper, silicon and other elements.

THE AMERICAN BRASS CO.

General Offices: Waterbury, Conn.

Offices and Agencies in Principal Cities

In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ont.

EVERDUR METAL FOR TANKS

RUSTLESS AS COPPER . . . STRONG AS STEEL

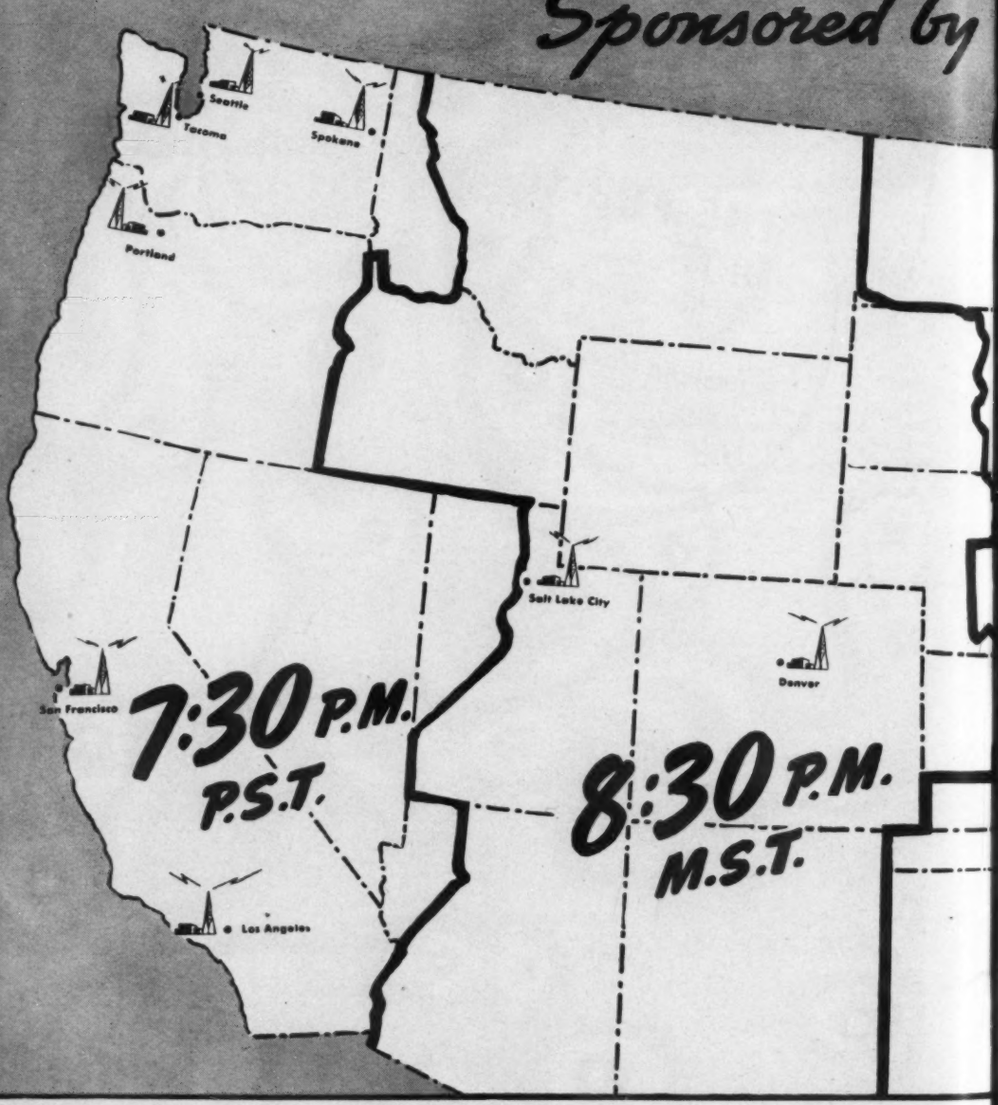
THE MARCH OF
GOES TO WORK FOR *GAS REFRIGERATION*

Stand By! 5 SECONDS TO GO!

"Time Marches On" THE AIR!

On its way TO MILLIONS!

Sponsored by



Blanketing the Nation with 45 carefully selected stations

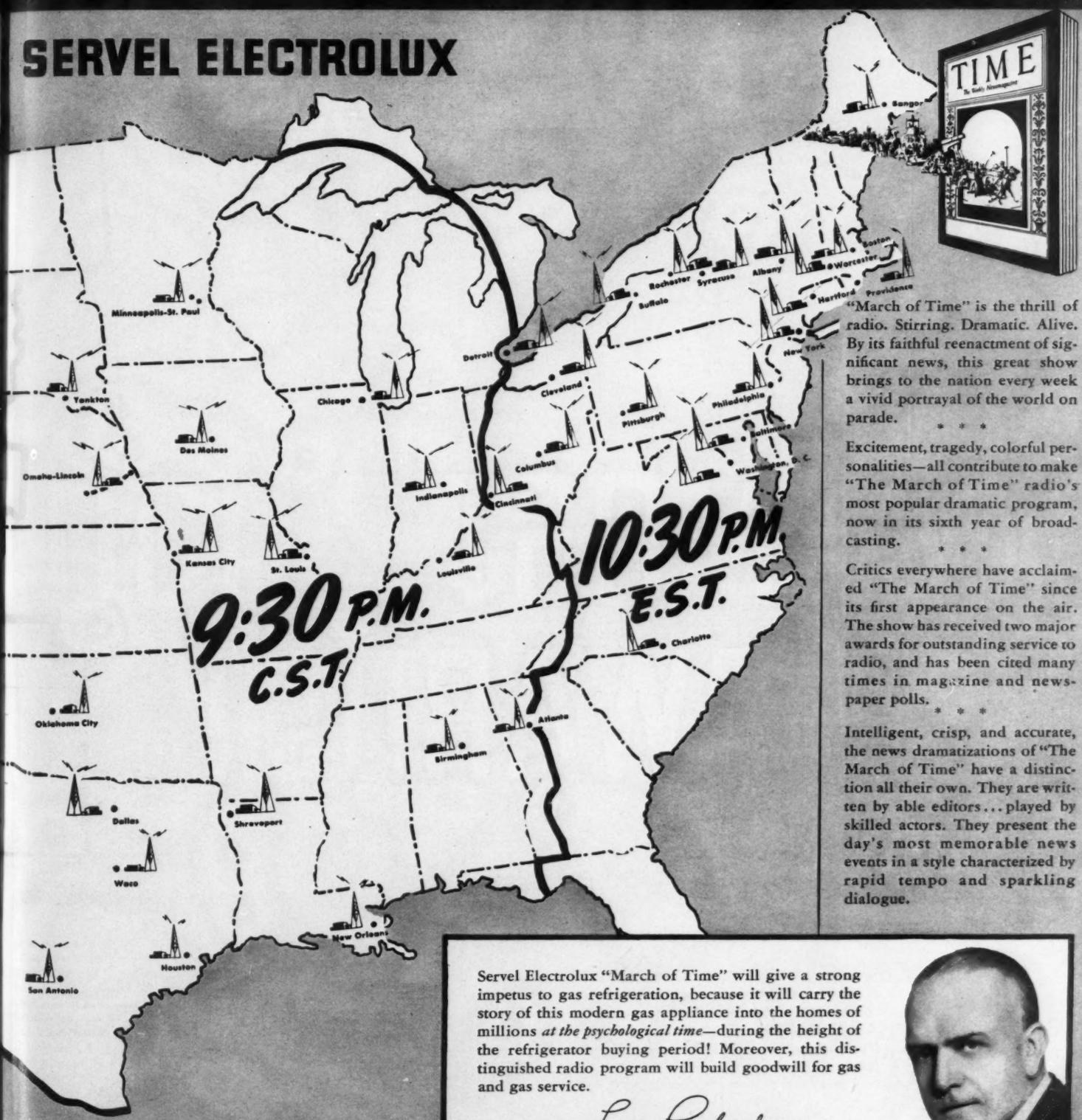
WOKO . . . . . Albany, N. Y.	WJR . . . . . Detroit, Mich.	WPRO . . . . . Providence, R. I.
WGST . . . . . Atlanta, Ga.	WDRC . . . . . Hartford, Conn.	WHEC . . . . . Rochester, N. Y.
WCAO . . . . . Baltimore, Md.	KTRH . . . . . Houston, Texas	KSL . . . . . Salt Lake City, Utah
WLBZ . . . . . Bangor, Me.	WFBM . . . . . Indianapolis, Ind.	KTSA . . . . San Antonio, Texas
WBRC . . . . . Birmingham, Ala.	KMBC . . . . . Kansas City, Mo.	KSFO . . . . San Francisco, Cal.
WEEI . . . . . Boston, Mass.	KNX . . . . . Los Angeles, Cal.	KOL . . . . . Seattle, Wash.
WKBW . . . . . Buffalo, N. Y.	WHAS . . . . . Louisville, Ky.	KWKH . . . . . Shreveport, La.
WBT . . . . . Charlotte, N. C.	WCCO . . . Minn.-St. Paul, Minn.	KFPY . . . . . Spokane, Wash.
WBBM . . . . . Chicago, Ill.	WWL . . . . . New Orleans, La.	KMOX . . . . . St. Louis, Mo.
WKRC . . . . . Cincinnati, Ohio	WABC . . . . . New York, N. Y.	WFBL . . . . . Syracuse, N. Y.
WHK . . . . . Cleveland, Ohio	KOMA . . . Oklahoma City, Okla.	KVI . . . . . Tacoma, Wash.
WBNS . . . . . Columbus, Ohio	KFAB . . . Omaha-Lincoln, Neb.	WACO . . . . . Waco, Texas
KRLD . . . . . Dallas, Texas	WCAU . . . . . Philadelphia, Pa.	WJSV . . . . Washington, D. C.
KLZ . . . . . Denver, Colo.	WJAS . . . . . Pittsburgh, Pa.	WORC . . . . Worcester, Mass.
KRNT . . . . Des Moines, Iowa	KOIN . . . . . Portland, Ore.	WNAX . . . . . Yankton, S. D.

"SERVEL ELECTROLUX 'MARCH OF TIME' WILL GIVE A STRONG IMPETUS

TIME RADIO'S FAMOUS NEWS DRAMATIZATION

WITH FULL ½ HR. PROGRAM *STARTING APRIL 15TH*

SERVEL ELECTROLUX



"March of Time" is the thrill of radio. Stirring. Dramatic. Alive. By its faithful reenactment of significant news, this great show brings to the nation every week a vivid portrayal of the world on parade.

* * *

Excitement, tragedy, colorful personalities—all contribute to make "The March of Time" radio's most popular dramatic program, now in its sixth year of broadcasting.

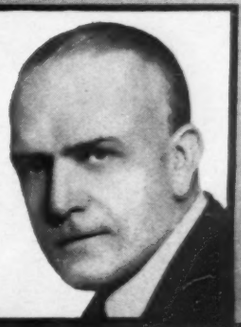
* * *

Critics everywhere have acclaimed "The March of Time" since its first appearance on the air. The show has received two major awards for outstanding service to radio, and has been cited many times in magazine and newspaper polls.

* * *

Intelligent, crisp, and accurate, the news dramatizations of "The March of Time" have a distinction all their own. They are written by able editors... played by skilled actors. They present the day's most memorable news events in a style characterized by rapid tempo and sparkling dialogue.

Servel Electrolux "March of Time" will give a strong impetus to gas refrigeration, because it will carry the story of this modern gas appliance into the homes of millions *at the psychological time*—during the height of the refrigerator buying period! Moreover, this distinguished radio program will build goodwill for gas and gas service.



Louis Ruthenburg
PRESIDENT, SERVEL, INC.

TO GAS REFRIGERATION... *BUILD GOOD WILL FOR GAS and GAS SERVICE"*

Hall M. Henry (CHAIRMAN)
THE UTILITY MANAGEMENT CORPORATION
NEW YORK, N. Y.

THE A.G.A. REFRIGERATION

Albert G. Schroeder, GRAND RAPIDS GAS LIGHT COMPANY, GRAND RAPIDS, MICHIGAN

Henry Dropp, MILWAUKEE GAS LIGHT COMPANY, MILWAUKEE, WISCONSIN

Paul J. Naschold, NEW HAVEN GAS LIGHT COMPANY, NEW HAVEN, CONN.

Clyde Potter, SOUTHERN COUNTIES GAS COMPANY, LOS ANGELES, CALIF.

L. H. Gardner, THE GAS & ELECTRIC APPLIANCE COMPANY, COLUMBUS, OHIO

L. O. Brown, SERVEL, INC., NEW YORK, N. Y.

ALMOST 2,000 AWARDS!

HAVE YOU SENT IN YOUR MARCH REPORTS

IF NOT, PLEASE FORWARD RESULTS OF THE WARM-UP DRIVE AS SOON AS POSSIBLE

CELEBRATE GAS REFRIGERATION'S

COMMITTEE INVITES YOU TO A

Big Birthday Party!

APRIL • MAY • JUNE

WE'RE going to have a party... a *big* party... for the entire gas industry. It will celebrate the tenth year of gas refrigeration—an important birthday in the life of an industry that has shown steady growth.

Your refrigeration committee is staging this spectacular jamboree during April, May, and June, with more awards than ever before. We want *everyone* to come to the party. Your committee fully expects this to be the biggest sales drive yet and is looking for a record registration of 12,000,000 meters.

There will be two schedules of awards—one for companies, one for retail salesmen—totalling nearly 2000 in all! There will be substantial cash awards for the companies, for individual achievements, and for largest total installations.

And, of course, *birthday cakes*. There'll be twenty-four Honor Cakes—one for *every* company winner. Real, honest-to-goodness cakes—great whoppers—that will be the biggest, probably, ever seen in your city. Big enough so everybody—consumers, employees, newspaper men, prospects—can have a slice at your own company party.

This year, competition will take place in eight divisions. The grouping differs from that of 1936, with changes—including a separate division for combination companies—calculated to broaden interest, widen opportunities, and make the contest more equitable.

Remember—to participate, each company must register with the refrigeration committee, and those registrations should be mailed not later than April 15th. Fill out your form and send it in now. (No entrance fee.) If you haven't received forms, write to J. W. West, American Gas Association, 420 Lexington Avenue, New York City.

Sponsored by the Refrigeration Committee of the American Gas Association and the A. G. A. E. M.

10TH ANNIVERSARY WITH *Record Sales*

The Advantages of NATURAL GAS over DIESEL ENGINES

By C. Remschel
Power Engineer, Southern Counties Gas Company

CONSIDERABLE publicity has been given the Diesel engine, of late, due principally, to new developments and applications, such as its use in streamline trains, trucks, tractors, etc. Also a great deal of propaganda has been given out by many of the trade-schools for the purpose of attracting students to Diesel engineering courses.

C. REMSCHEL

This most interesting publicity has been absorbed by the general public. Unfortunately, it has left the impression that the modern Diesel engine is a cure-all; that it can be applied economically to all power requirements. This, of course, is far from the truth.

The Diesel engine, like any other prime mover, has its field in which it serves best when properly applied. It is the intent of this article to point out the reasons why a natural gas engine is preferable to a Diesel engine in such localities where natural gas is available at reasonable rates.

In order to understand properly the reasons to be set forth, it is necessary that the reader be somewhat familiar with the cycle of operation of both the gas and the Diesel engine, and for that reason we offer a brief description for the benefit of those not familiar with this.

There are two types of gas and Diesel engines: namely, two and four cycle. Inasmuch as the four cycle engine is most commonly used, our reference will apply to same; however, the points to be brought out apply equally well to the two cycle engine. The cycle of operation of the four (stroke) cycle Diesel engine follows:

The first, or intake, stroke takes in a charge of fresh air through the open inlet valve. The piston moving downward pumps in air, filling the cylinder. When the piston nears the bottom of its stroke, the inlet valve closes.

In the second, or compression, stroke, the air in the cylinder is compressed to from 450 to 550 lbs. per sq. in. Through this action of compression the temperature of the compressed air reaches as high as from 900 to 1,000 degrees F. This is the temperature of red hot steel. The fuel is injected into this air in a fine spray and starts to burn immediately. The pressure in the cylinder rises to from 600 to 700 lbs. per sq. in. and, frequently, even higher.

In the third, or power, stroke, the hot gases expand against the walls in the cylinder and force the piston downward. In this way the chemical energy of the fuel is converted to mechanical energy to move the piston.

In the fourth, or exhaust, stroke, the exhaust valve opens and the piston moving upward forces the burned gases out to make room for a new charge of fresh air. The engine then starts on a new cycle, with the first, or intake, stroke.

The operation of the gas engine is practically the same, with the exception that instead of taking in a charge of air only, it takes in, on the intake stroke, a properly proportioned mixture of air and gas, and instead of igniting the fuel, or mixture, with the heat of compression, it ignites this mixture with an electric spark.

The vital difference between these two types of engines is that in the Diesel engine the compression pressures are from 450 to 550 lbs. per sq. in., while in the gas engine these pressures are from 100 to 125 lbs. per sq. in., and, in the gas engine, during the burning of the fuel, the pressures are from 250 to 300 lbs. per sq. in., instead of from 600 to 700 lbs. per sq. in. These differences in pressures are all-important, giving the gas engine great advantage.

These high pressures in the Diesel engines necessitate their being of heavier construction—frame, crank shaft, bearings, connecting rods, wrist pins, etc. For economical manufacture, most engine builders, making both gas and Diesel engines, build both on the same frame and running gear. This means that a gas engine manufactured under these conditions is built very much heavier than is necessary and will have a longer life and lower maintenance than if operating as a Diesel engine.

In the operation of a natural gas engine the fuel burns absolutely clean, there being no carbon deposit from the burning of the fuel. This is not so with a Diesel engine. The best of Diesels are unable to burn the fuel clean, and more or less carbon is formed, which is deposited on the cylinder and piston heads. This carbon deposit builds up, and, in time, breaks off, a considerable amount being forced between the cylinder and piston walls, sticking the piston rings and acting as an abrasive, resulting in high maintenance cost, reduction in power developed, and increased fuel consumption, the last two conditions being due to stuck piston rings.

The fuel in the Diesel engine is injected in minute quantities by fuel pumps. In some instances the fuel is injected under pressures of more than 6,000 lbs. per sq. in. in order that the fuel be atomized properly and will penetrate the air that is under compression in the cylinder. It is difficult to keep these fuel pumps and their various connections always in proper adjustment, and if they are out of adjustment, improper combustion is obtained, which results in poor fuel economy, increased carbon deposit, and loss of power.

After the Diesel engine has seen wear it becomes quite difficult to lubricate the cylinder walls properly, for the reason that the high pressures in the combustion chamber blows by the piston rings and blows out most of the lubricating film from between the piston and cylinder walls.

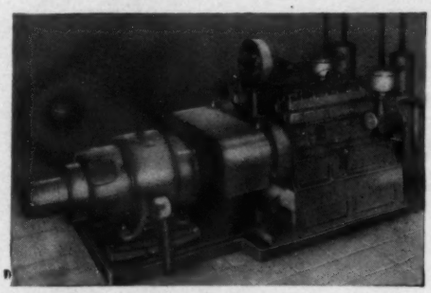
While Diesel engine manufacturers make some very attractive fuel guarantees and can meet them while the engine is new, very soon, as the engine starts to wear, this fuel economy decreases materially. Summing up the above, we have the following points to consider when comparing the Diesel with the gas engine:

(Continued on Page 79)

THE ARTICLE by Mr. Remschel herewith published is the fourth in a series dealing with internal combustion engines. This series will be continued in the May issue of GAS by Gilbert Woodhill of the Ensign Carburetor Company who has chosen as his subject the use of dry gas (natural gas and butane mixtures) in internal combustion engines. The article will deal generally with internal combustion engine design and will contain specific engineering data worked out in the company's laboratories and checked by field experience.

"Every one of those types of business — and many more in your territory, are NOW prospective buyers of gas* to make their own light and power."

*LYCOMING Continuous Duty NATURAL GAS ENGINES



These Lycoming Engines replace purchased electric power, either by means of generation or direct application of the engine to the load. They are clean, quiet, vibrationless, and cool—and are engineered for 100,000 hours continuous duty. New, dual-engine-driven generating units eliminate stand-by necessity. Lycoming Natural Gas Engines and Gas Engine Generating-Units are built complete in one factory. *Write us for complete information.*

LYCOMING MANUFACTURING COMPANY

Home Office, Works and Foundries, WILLIAMSPORT, PENNSYLVANIA

QUALITY ENGINE BUILDERS FOR 30 YEARS

AT LEFT: Typical Service Representative unit in a Bell System company. BELOW: A Service Representative's desk showing handy location of records for her group of accounts.

PERSONALIZING Customer Contacts

A Glance Behind the Scenes at Telephone Company Procedure

By ANATOL FOMILYANT
News Editor, GAS

IN THE field of customer contacts one utility service may profit from examining the routines worked out by another, even though problems to be met are not identical.

The following brief sketch of the Bell Telephone System's method for handling customer contacts, known as the Service Representative Plan, is offered for what it may suggest in the way of helpful practices applicable to gas utility procedure.

The Service Representative Plan was developed in the Bell System some ten years ago and was first tried out in eastern cities. Since then it has been adopted as standard practice in nearly all Bell System companies throughout the country.

The working structure of the Service Representative Plan is designed with the one-man rural office as its ideal. In such an office, of course, all transactions —contact, clerical, sales and collections —are handled by the one man. This enables him to have a knowledge of all phases of each customer's telephone service, to know many or all of the customers by sight, by name, and by voice—in short, to give the truly personal type of service which all business houses desire to give but which is so difficult to achieve through a large organization in which each different type of work is handled by a group of specialized employees.

The Service Representative Plan is, then, the subdivision into a number of one-man offices of the large urban telephone exchange. Under this plan the Service Representative handles contact, clerical, sales and collection work for a certain number of accounts and is able to achieve greater familiarity with his customers than is possible under a plan in which the several phases of this work are divided among the several specialized departments.

The Service Representative of the one-man subdivision is charged with the servicing of a given group of accounts, say 2000*—the numbers from CApitol 0001 to CApitol 2000. Whenever one of these customers calls the company on any matter pertaining to contact, records, sales or collections, his call is routed by the operator to the proper Service Representative by the customer's telephone number (any number in the CApitol prefix from 0001 to 2000). All records pertaining to these accounts are located at the Service Representative's desk. Thus, he has at his elbow all necessary information relative to the account—the type of service the customer has, his classification as to paying habits, status of the current bill, etc., as well as a mental picture and appraisal of the customer from previous contact.

Obviously this method—the centralization of records coupled with the personal knowledge of the Service Representative based on experience—enables him to appraise more accurately the customer's needs, value of his word as to payment of delinquent bills, true nature of his complaints, etc. Thus he is better equipped to try to sell more adequate service, to justify practices effectively to the irate customer, better able to judge when extensions of time on unpaid bills are warranted. An important by-prod-

(Continued to Page 81)

*This figure is not to be taken as typical, as conditions in different exchanges vary widely.

Built to Prove

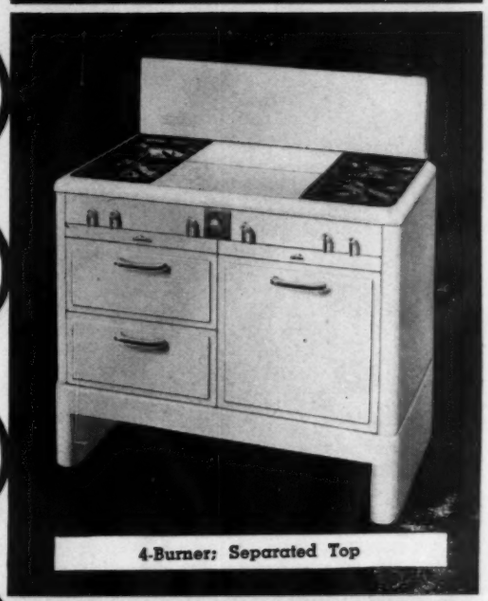
"GAS IS THE FINEST FUEL FOR COOKING"

DETROIT JEWEL and GARLAND Gas Ranges, because they are most DEPENDABLE IN PERFORMANCE, LOVELY TO LOOK AT and ECONOMICAL TO OWN assure gas utility merchandisers GREATER VOLUME, GREATER PROFIT and GREATER CUSTOMER ALLEGIANCE!

◆ ◆ ◆

Never have Detroit Jewel and Garland Gas Ranges been more deserving of their leadership than now . . . with the new 1937 lines including beautiful, precision-built values for every demand of your market. Note the new 6-Burner Model pictured at the right and the two types of cooking tops on 4-Burner Models. These ranges insure the popularity of gas as the superior cooking fuel; they insure more enthusiastic use; better cooking results; substantial community popularity — all of which means greater sales volume for you.

6-Burner Model



4-Burner; Separated Top

4-Burner; Standard Top

GAS IS THE IDEAL FUEL
and at its best when used with Detroit Jewel and Garland Gas Ranges.

DETROIT - MICHIGAN STOVE CO.
DETROIT, MICHIGAN

Effect of Fluctuating Gas Pressure On Domestic Appliance Performance

● C. ELDON WHITE and C. W. STEWART, San Diego Consolidated Gas and Electric Co., San Diego, Calif.; addressing the Pacific Coast Gas Association Spring Technical Conference, Los Angeles, Calif., March 18-19, 1937.—(Abstract by G A S).

THE purpose of this investigation was to determine whether it is necessary to use an auxiliary low pressure gas regulator at the inlet of a domestic gas appliance in the event of fluctuating service pressure.

For convenience of testing, the standard pressure on the inlet of the appliance was considered 6 inches of water, and the effect of fluctuating pressures within the range of 3 inches to 9 inches of water, upon the behavior of appliances, was observed.

Performance of Regulators.

A compressed air line was connected to the inlet of a regulator; the outlet of the regulator to the inlet of a meter, and also to a water manometer. The outlet of the meter was connected to a series of selective orifices.

The regulator was tested when operating with three different inlet pressures, the first being 6 inches of water. With this pressure the rate of flow was measured by the meter, the rates being determined by the various selective orifices. The outlet pressure of the regulator was taken for each of the various rates of flow. This process was repeated for inlet pressures of 3 and 9 inches water column respectively.

Using the results obtained by the method just described, performance curves were drawn for each regulator. Figs. 1 and 2 are typical curves.

It will be noted that the performance curves for inlet pressures of 6 and 9 inches are nearly identical for ½ to ¾-inch regulators. In some instances the pressure delivered to the orifice fell very considerably, even for moderate rates of flow. The best type of regulator delivered gas at a relatively large rate at a nearly constant pressure of only 4 inches; the poorest dropped to a low point of 1 inch when the inlet pressure was 6 inches and the gas flow 112 cu. ft. per hour.

However, when the inlet pressure was 3 inches, the drop in pressure through the regulator was not so startling, except in one case where a flow of 79 cu. ft. per hour caused a drop in pressure to 0.5 inch.

Nevertheless, the use of such regulators to deliver less than 4 inches of pressure to the appliance would probably not be considered; hence the capacity of the appliance is strictly limited by the regulator. This capacity is indisputably less than it would be in the absence of such a regulator, regardless of the inlet or line pressure.

It is evident that the connection of a regulator to the inlet of an appliance limits the amount of gas which can be consumed by the appliance.

Effect on Orifice Capacity

First, the apparatus described above was used, except that one definite orifice was selected for each regulator; the size of this orifice was so chosen that the gas pressure delivered to it by the regulator in question was 4 inches of water. Second, a similar orifice of smaller diameter was used for a control or comparison test without a regulator, the size being such that its capacity at 6 inches was the same as the first mentioned at 4 inches.

First, using the apparatus with the regulator, various line pressures from 3 inches to 9 inches were applied to the inlet, and the rate of gas flow was noted by means of the meter; Figs. 1 and 2 show this as line A on the orifice per-

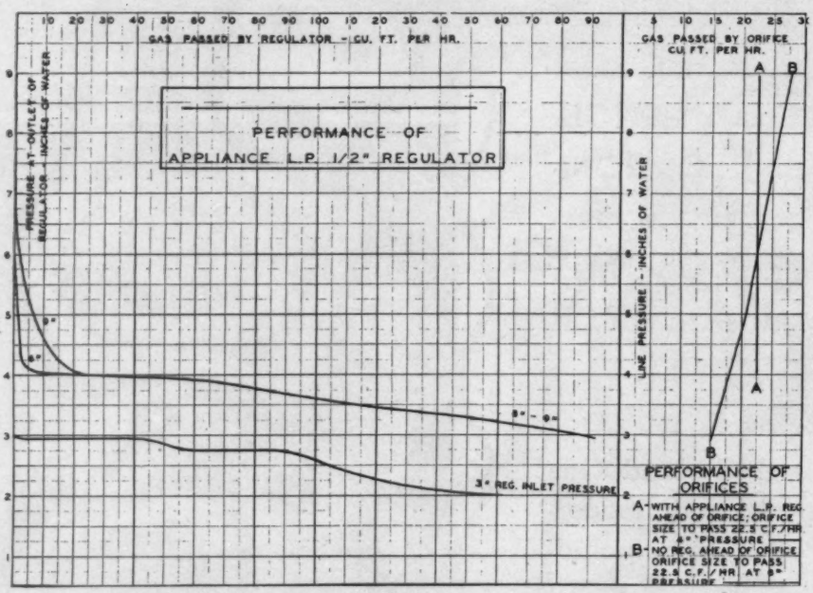

GAS PASSED BY REGULATOR - CU. FT. PER HR.
PRESSURE AT OUTLET OF REGULATOR - INCHES OF WATER
PERFORMANCE OF APPLIANCE L.P. 1/2" REGULATOR
9"
8"
8" - 9"
3" REG. INLET PRESSURE
GAS PASSED BY ORIFICE CU. FT. PER HR.
LINE PRESSURE - INCHES OF WATER
A
B
PERFORMANCE OF ORIFICES
A- WITH APPLIANCE L.P. REG. AHEAD OF ORIFICE; ORIFICE SIZE TO PASS 22.5 C.F./HR. AT 8" PRESSURE
B- NO REG. AHEAD OF ORIFICE; ORIFICE SIZE TO PASS 22.5 C.F./HR. AT 8" PRESSURE

FIG. 1. Performance of appliance low pressure ½-inch regulator.

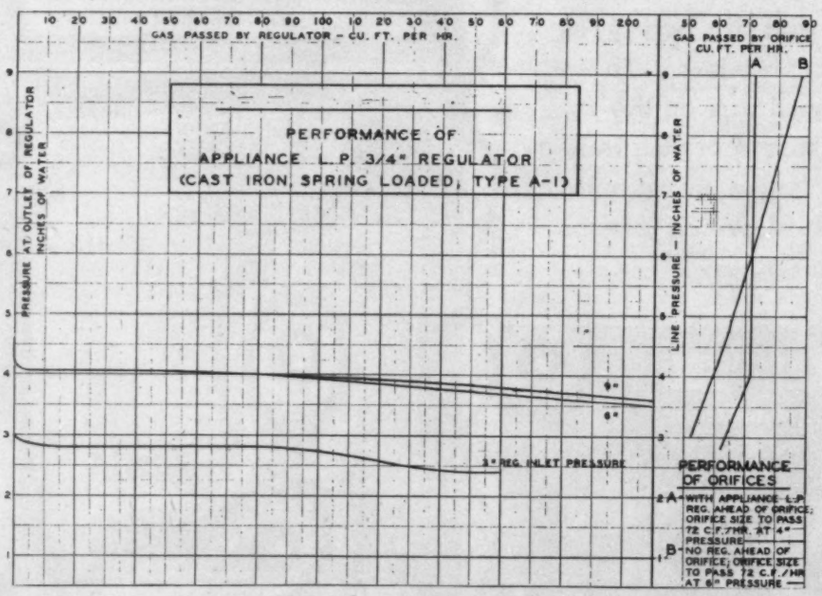

GAS PASSED BY REGULATOR - CU. FT. PER HR.
PRESSURE AT OUTLET OF REGULATOR - INCHES OF WATER
PERFORMANCE OF APPLIANCE L.P. 3/4" REGULATOR (CAST IRON, SPRING LOADED, TYPE A-13)
9"
6"
3" REG. INLET PRESSURE
GAS PASSED BY ORIFICE CU. FT. PER HR.
LINE PRESSURE - INCHES OF WATER
A
B
PERFORMANCE OF ORIFICES
A- WITH APPLIANCE L.P. REG. AHEAD OF ORIFICE; ORIFICE SIZE TO PASS 72 C.F./HR. AT 4" PRESSURE
B- NO REG. AHEAD OF ORIFICE; ORIFICE SIZE TO PASS 72 C.F./HR AT 6" PRESSURE

FIG. 2. Performance of appliance low pressure ¾-inch regulator (cast iron, spring loaded, type A-13).

■ "Some youngsters are really mischievous. Not yours perhaps—but some of his friends. Such healthy youngsters frequently have grimy hands when they raid the refrigerator, and in their haste they may be careless in their handling of heavy dishes, crocks, or pans. Perhaps in a moment of daredeviltry they will try to scratch or mark the smooth surface of this appliance.

"Porcelain enamel is the only finish that will stand such abuse. You can wash away the grime as easily and quickly as if it were a china plate; its flint-hard surface cannot be scratched.

"We always recommend porcelain enamel, Madam,—for the very selfish reason that we *know* it will make you a satisfied customer. It is the lifetime finish, and we want lifetime customers."

EDUCATIONAL BUREAU
PORCELAIN ENAMEL INSTITUTE, Inc.
612 North Michigan Avenue
Chicago

WRITE — TODAY — FOR A FREE COPY OF BOOK JUST OFF THE PRESS:
"SELLING POINTS FOR HOUSEHOLD APPLIANCES"

PORCELAIN ENAMEL *THE Lifetime Finish*

formance graph, on which the rate of flow is the abscissa and the line pressure the ordinate. Second, in the absence of a regulator, and assuming the standard pressure of 6 inches at the appliance, the smaller orifice should pass gas at the same rate as the regulated orifice at 4 inches for the purpose of comparison. Accordingly, this unregulated orifice was calibrated from tables at various line pressures from 3 to 9 inches; the calibration is represented by the line B of the orifice performance graphs, Figs. 1 and 2.

In explanation of the smaller orifice size chosen for comparison, it should be remembered that with the regulator the pressure delivered to the orifice is certain to be less than line pressure, and its size must therefore be increased for a given rate of gas flow through the orifice.

There were, therefore, two orifices: One buffered from fluctuating line pressure by a regulator, the second naked and vulnerable to its effect.

The orifice performance charts (Figs. 1 and 2) indicate by the angle between the lines A and B the degree to which the gas flow is adversely affected by fluctuating pressure.

It appears from inspection of these charts that a regulator would be indicated for those appliances which require the most constant flow possible, assuming the distribution system to have such a wide spread of pressure; how many appliances actually require such a constant flow will be mentioned later. Obviously the regulator is of greater help for the extremes of pressure impinged upon it.

Effect of Fluctuating Pressure on Gas Consumption of Various Appliances Without Regulators.

Equipment consisted of various appliances on consumers' premises; test meter; pressure gauges; no appliance regulator. The rate of flow in cu. ft. per hour was noted for the various appliances, at pressures of 3, 6, and 9 inches of water. The results are shown in Table No. 1.

The rate of flow of these unregulated appliances increases rapidly with increase of pressure from 3 to 9 inches, with the exception of the thermostatically controlled ovens. Now the orifice performance charts (Figs. 1 and 2) indicate that from 3 to 6 inches only would the rate of flow vary, had a regulator been present; hence fluctuating pressure influences gas consumption to a maximum of about 25 per cent in the absence of a regulator, or from 13 to 0 per cent in the presence of a regulator and low line pressure, provided the line pressure varies from 3 to 9 inches.

TABLE NO. 1. EFFECT OF FLUCTUATING PRESSURE ON GAS CONSUMPTION OF VARIOUS APPLIANCES WITHOUT REGULATORS

Type of Appliance		Pressure at Inlet Inches of Water 3	6	9
Storage water heater pilot (lava tip, blue flame)	c.f/hr.	0.28	0.38	0.47
Range pilot	"	0.143	0.2	0.245
Mean, 4 top burners, smooth range	"	6.9	9.8	11.4
Uninsulated Oven, 16 x 2 0 x 14 inches	"	17.2	25.7	30.1
Same, maintaining 350 deg. F.	"	5.32	5.3	5.27
20 gal. auto storage water heater	"	14.4	20.7	24.6
7-single radiant heater	"	9.6	13.0	16.01
Mean, 3 floor heaters	"	13.0	18.2	22.4
Top burner lighter	"	0.129	0.18	0.221
Instan. automatic water heater	"	68.9	96.5	117.9
Pilot for same	"	0.58	0.81	0.996
Triple-insulated oven, 18 x 20 x 16 inches	"	12.77	16.42	20.4
Same, maintaining 350 deg. F.	"	2.92	2.9	2.88
Mean, 4 top burners, open range	"	6.1	8.41	10.09
Simmer burner	"	0.99	1.38	1.70
Relative consumption without regulator		73%	100%	122%
Probable relative consumption with regulator		87%	100%	100%

TABLE NO. 2. EFFECT OF FLUCTUATING PRESSURE ON EFFICIENCY OF UTILIZATION

(Mean of Twenty Tests)

Range	Burner	Efficiency at Pressure, Inches of Water 3	6	9
Open top	Star type	30.2%	28.7%	27.8%
Closed top, lid off	Star type	24.7%	26.3%	23.3%
Closed top, lid on	Star type	18.1%	18.5%	18.4%

C. ELDON WHITE

C. W. STEWART

Efficiency of Utilization of Unregulated Ranges.

Apparatus included a 3 quart aluminum percolator, 8.5 inches in height, 5.5 inches in diameter, containing 4.82 lbs. of water; top burners on 3 ranges; test meter, barometer, thermometers, stop watch, calorimeter.

The method provided for 4.82 lbs. of water were heated in the percolator over a top burner of a range supplied with gas at constant pressure. The volume of gas required to raise the temperature of the water from 100 deg. F. to 200 deg. F. was noted, and from the known heating value of the gas, the ratio of 482 B.t.u. recovered to the B.t.u. of combustion, or efficiency of utilization, was determined. Such a ratio was determined for 3, 6, and 9 inches respectively, without any adjustment of the appliances.

The average results obtained from 20 such tests are shown in Table No. 2.

Such small differences in efficiency as are noted between those at pressures of 3, 6, and 9 inches are so slight as to be negligible. It must be concluded that such an extreme pressure spread does not materially affect the amount of useful heat delivered to the consumer.

Effect of Fluctuating Pressure on Temperature of Thermostatically Controlled Oven Without Appliance Regulator.

In this test the equipment was a fully insulated oven; thermometer; oven thermostat; no regulator.

The oven was operated with the thermostat at a fixed position for 30 minutes, with gas inlet pressure of 6 inches. After maintaining this temperature for 30 minutes, temperature readings were taken at intervals of one minute for 15 minutes. The pressure was then reduced to 3 inches for 37 minutes, and temperature readings were taken as before. The pressure was then raised to 9 inches for 40 minutes, temperature readings being made as before.

Throughout the test the oven temperature was held practically uniform within the range of 352° F. to 361° F.

It is therefore concluded that an insulated oven, thermostatically con-

MANY AN "OH" . . . BUT NEVER AN "AW"

ENDURO
REG. U. S. PAT. OFF.
REPUBLIC'S PERFECTED STAINLESS AND HEAT-RESISTING STEELS

Licensed under Chemical Foundation Patent No. 1339378.

REPUBLIC STEEL

● In show rooms, the "OH"s expressed by prospects when their eyes meet the beauty of ENDURO Stainless Steel trim on heaters, ranges and other appliances is indication that already part of your selling job has been done.

The absence of "AW"s after the appliance has been installed and in use tells a story, too — a story of satisfaction so far as the ENDURO is concerned for the life of the appliance.

Give yourself a sales talk on your products — and then consider this: Wouldn't ENDURO add to the appearance and to the sales arguments?

Republic Steel Corporation

GENERAL OFFICES . . . CLEVELAND, OHIO
ALLOY STEEL DIVISION . MASSILLON, OHIO

NEW LIFE TO SELL—LONG LIFE TO STAY SOLD

ENDURO, Republic's Perfected Stainless Steel, is available in a variety of finishes, one of which will help your designer to snap up the design or accentuate colors by contrast with ENDURO'S lasting silvery-white lustre. ENDURO is also available in analyses that resist high temperatures—that will insure long life for burner parts.

Write for literature and full details.

trolled, maintains a constant temperature in the face of any reasonable pressure fluctuation.

Effect of Fluctuating Pressure on Temperature of Water From Thermostatically Controlled Water Heater Without Regulator.

Equipment consisted of an automatic water thermometer, thermostatically controlled. The temperature of the effluent water with gas pressures of 3, 6, and 9 inches was noted.

The water temperature remained constant within 2.5 deg. F. regardless of the gas pressure; hence the thermostat of the water heater (as is also true of the oven above) provides ample control over fluctuating gas pressures without the aid of a regulator.

Gas Range Pressure Regulators

● **A. H. MILLS, Superintendent, Knoxville Gas Co., Knoxville, Tenn.; addressing the Southern Gas Association and Southwest Gas Sales Conference, Memphis, Tenn., March 10, 11, and 12, 1937.—(Abstract by G A S).**

ANYTHING that tends to make the gas range a more satisfactory appliance—gas cooking more superior to competitive methods—not only tends to intrench the industry more firmly in the cooking field but also in other heat applications as well. Furthermore, a satisfied customer is not only a good advertisement but also a good prospect for additional service.

One step the Knoxville Gas Co. has taken to improve range performance is the installment of a small pressure regulator on the gas inlet pipe of every new range. The range is then put through a shop test and adjusted before delivering it to the customer's premises for connection.

It was reasoned that by reducing pressure variation to a point where burner inlet pressures would be practically constant, advantage could be taken of an inherent characteristic of gas to provide customers with a uniformity of cooking performance that could not be approached by competitors, thus making gas cooking still more desirable to the housewife. This characteristic is that the flow of gas through an orifice varies as the *square root* of the pressure drop through the orifice and consequently the heat output of a range burner at any given setting of the control valve varies in this same proportion with any change in pressure at the burner manifold. With an electric range, the heat output of an element for any given switch position varies as the *square* of the voltage at the element terminals. This difference in heat output performance is greater than it sounds.

Assuming a 10 per cent drop in both electric voltage and gas pressure, the resultant drop in heat output of the electric heating element is 19 per cent and only 5 per cent in the case of the gas burner. The advantages to the housewife of uniform heat output, once the control is set, are too obvious to need comment, particularly if she wishes to use the so-called "waterless" method of cooking vegetables.

The selection of a suitable pressure regulator is, of course, most important, for therein lies the secret of constant and uniform regulation of heat input of the range. The most important requirements are:

1. The regulator must be small, sturdy and free from mechanical difficulties in order to eliminate as far as possible any servicing.

2. The performance requirements should be such that the variations in outlet pressure of the regulator when operating under the specific conditions of inlet pressure and flow requirements of the range will be as low as possible.

In determining regulator performance it is necessary to start from a base or adjustment point. The adjustment point adopted is an inlet pressure of 6 inches with an outlet pressure of 3.5 inches when the volume of gas passing through the regulator is 18 cu. ft. per hour. This is the amount of 500 B.t.u. gas required by one top burner with a heat output of 9000 B.t.u. per hour. With the particular regulator used when all burners including the oven burner are in operation the outlet pressure of the regulator will be reduced to 3.1 or 3.0 inches with the inlet pressure maintained at 6 inches. In other words, when operating at maximum load the pressure reduction is 11.8 per cent, resulting in a reduction in burner heat output of 6 per cent. Tests indicate that the actual operating demand of a range is approximately half the connected load, hence even the above variation would occur infrequently.

The Growing Field for Unit Heaters

● **R. L. TOWNE, Surface Combustion Corp., Toledo, Ohio; addressing the Eastern Regional Natural Gas Sales Conference, Pittsburgh, Pa., February 4, 5, and 6, 1937.—(Abstract by G A S).**

GOVERNMENT statistics and other available figures as recent as the month of October show that for that month gas-fired unit heater production equalled almost the entire balance of 1936. This sales increase is approximately 156 per cent, while for other types of unit heaters, the increase amounts to some 78 to 82 per cent. These figures, incidentally, while reasonably accurate, cannot be taken as actuals because the entire year's figures are not yet available.

The biggest reason for increasing popularity of the gas-fired unit heater is its adaptability to supplementary heating. This is because installation is simpler: the heater requires no heating system changes; it is installed where needed most; there is no interruption to business; the units are supplied faster; the units are installed more quickly.

The smaller store is a natural market for the gas-fired unit heater and, in fact, the unit makes definite contributions to any commercial establishment. It provides first, freedom from the dirt and the film that other types of fuel produce with the consequent ruination of stock. Second, freedom from worry over constantly changing heating equipment conditions. It is controllable to the point where there is no concern over the overall average temperature of the establishment. Third, it provides heat where needed most—in any part of the store. Fourth, it reclaims all of the thousands of square feet of floor space now taken up by the old out-moded type of heating equipment and radiation. Fifth, it offers freedom from repairs and servicing worries with their consequent cost. Sixth, it saves time in tending the heating plant, trying to control it, in trying to keep stocks clean and fresh; and saves time wasted during installation of more complicated equipment. These are arguments which must be taken to the business man; the wedges with which to gain entry into this already booming market.

■ ■

Bain Is Lone Star Industrial Gas Sales Engineer

Thomas C. Bain, who has been with the Lone Star Gas Co. since 1928, has been appointed industrial gas sales engineer for the Waco, Texas, territory. He succeeds T. J. Skrabanek, recently transferred to Dallas as assistant industrial engineer for the system.

Mr. Bain, before his new appointment, was stationed at Wichita Falls.

BESIDES

Model shown: No.1045-CT.....Closed Top, Table Top Model
Model shown: No. 1085-OT.....Open Top, Table Top Model

BEAUTY, STYLE & FINISH— WHAT MAKES A WEDGEWOOD GAS RANGE ENTIRELY MODERN?

THESE 4 essential FEATURES

1. Wedgewood's Extra-Low-Temperature Oven (with automatic temperature control). Lights itself.

Low, even heat — automatically controlled —cooks roasts to juicy tenderness . . . saves pounds of meat from shrinkage . . . retains nourishing meat juices. No watching required. Up to 20% saving on gas. Oven lights itself.

2. Wedgewood's Automatic Cooking Clock

Takes full charge of oven roasting . . . turns gas both on and off at any given time. Gives you free hours away from the kitchen.

3. Wedgewood's Speed-Plus-Simmer Burners

Low, gentle simmer flames for waterless or semi-waterless cooking . . . vegetables retain all natural flavor and vitamins. No burnt pans . . . no boil-overs to watch. Less gas used.

4. Wedgewood's Astogril Broiler

Cooks steaks, chops, etc., without shrinkage. Sears meat both sides at once . . . seals in natural meat juices and flavors. Easy to get at . . . no stooping . . . requires little attention. No smoke in the kitchen . . . no spattering fats.

● Savings on food, flavor and vitamins pay for these features MANY TIMES OVER.

Your customers will want these 4 modern features . . . if you demonstrate all of them. You'll not only sell more ranges . . . you'll make a GREATER PROFIT on each unit.

ONLY WEDGEWOOD HAS ALL 4

PLUS BEAUTY . . . PLUS STYLE . . . PLUS FINISH

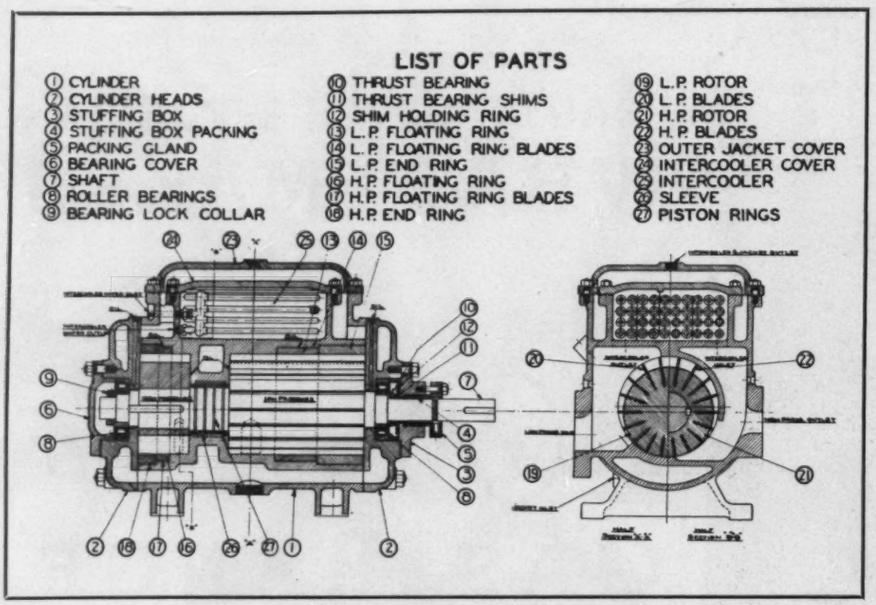


FIG. 1. Section through standard Ro-Twin rotary air compressor.

A Discussion of the Sliding Vane Type Rotary Gas Compressor

● **H. W. WALTERS, Allis-Chalmers Co., Los Angeles, Calif., in paper entitled "Rotary Compressors and Reciprocating Compressors," to Compressor Plant Sub-Committee, Pacific Coast Gas Association Spring Technical Conference, Los Angeles, Calif., March 18-19, 1937.—(Abstract by GAS).**

THE sliding vane type rotary compressor consists of a honed cylinder with removable heads and a rotor arranged eccentrically within the cylinder. Usually the cylinder and heads are water-jacketed, although they may not be, depending on pressure and operating conditions. The rotor is mounted on a shaft and is fitted with blades or "vanes" free to move radially in slots cut longitudinally along the rotor. The crescent-shaped space between the casing and the rotor is thus divided into a number of cells corresponding to the number of blades. As the rotor revolves, the sliding vanes are thrown outward by centrifugal force, and each cell starting from a minimum capacity grows to a maximum and decreases to a minimum again with each revolution producing suction and compression. The action is shown in the right-hand sectional drawing in Fig. 1.

H. W. WALTERS

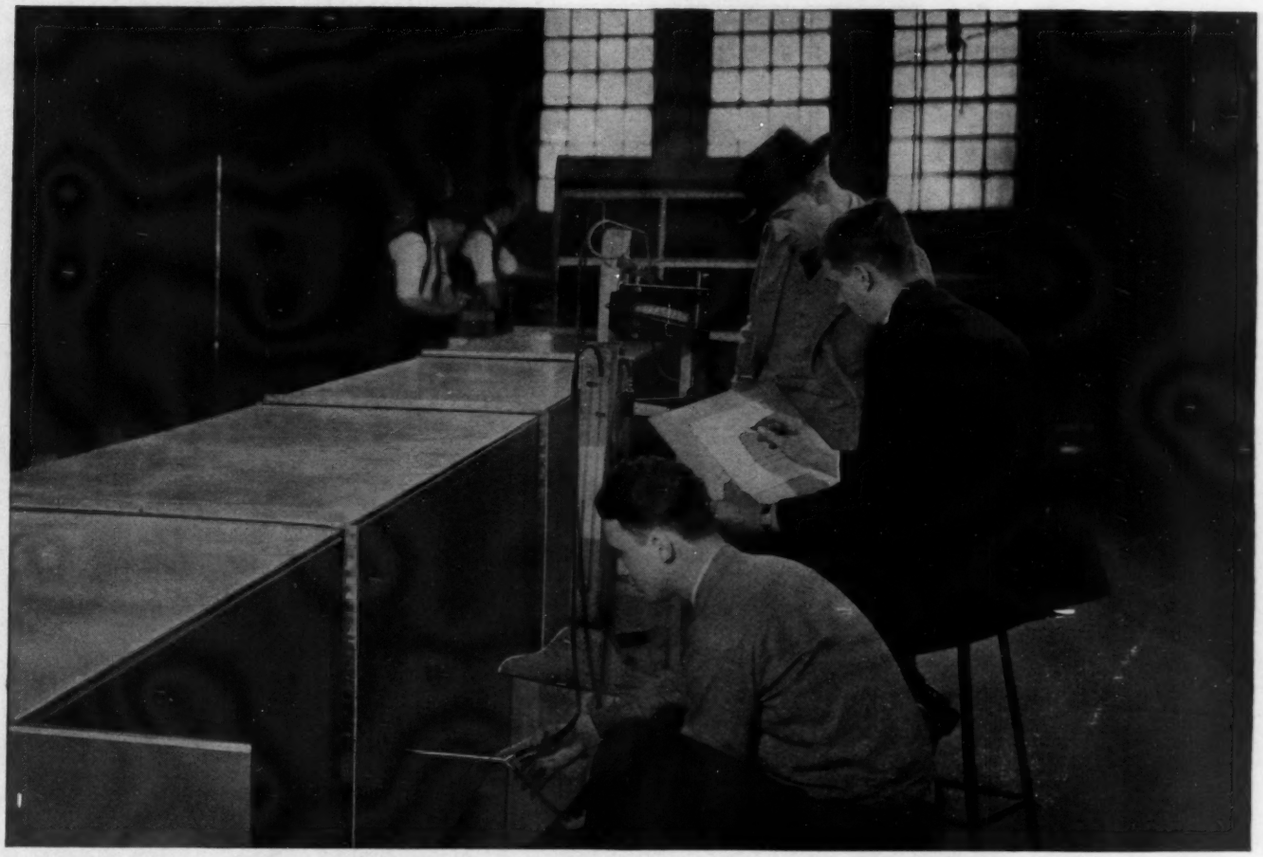
Early designs encountered a discouraging obstacle in the considerable amount of friction developed by the vanes against the walls of the cylinder which lowered the mechanical efficiency, caused excessive wear and limited the operating speed. Development of the Floating Rings entirely eliminated this obstacle, and is therefore one of the cardinal features of this design. Two of these rings are used in each cylinder. The Floating Rings are each made in one piece with their inner diameters slightly less than that of the cylinder bore. When the blades fly out under centrifugal force, they bear against the rings, the friction causing them to turn with the rotor and blades. A slight clearance between the outer surface of the rings and the casing is filled with an oil film introduced under pressure from a mechanical force feed lubricator which also feeds oil to the ends of rotor. This oil spreads over the inner heads and finds its way along the shaft to the bearings.

The rotor is mounted on a shaft supported in roller bearings housed in the cylinder heads at either end, which also contain suitable packing glands and metallic packing effectively preventing leakage along the shaft where it emerges from the compressor or vacuum pump. It will be noted that the air or gas handled is trapped between two blades, and cannot slip back through the machine, but must pass out into the discharge line, regardless of the resistance encountered. The unique feature of the labyrinth packing effect of the multiple cells effectively breaking up the pressure range between suction and discharge with only a small pressure differential between cells, eliminates intercellular leakage or slip, and combined with small inherent clearance produces high volumetric and overall efficiency. The method of operation, whereby the air or gas handled must pass to the discharge regardless of discharge resistance identifies the rotary compressor as a "positive pressure" machine in common with reciprocating compressors and lobular blowers, as distinguished from centrifugal compressors. Unlike reciprocating compressors and pusher type blowers, however, the sliding vane rotary compressor does not become "positive pressure" until sufficient speed has been built up to cause the blades to fly out against the casing rings by centrifugal force. Therefore, the machine always starts unloaded, and the only starting torque required is that necessary to overcome the inertia of the rotor. This eliminates all danger of accidentally starting the compressor against load or the necessity of starting unloaders and expensive motor starting equipment.

Due to the inherent construction of the multiple cell type rotary compressor with its multiplicity of blades in the rotor and relatively high speed, the air or gas enters the discharge pipe in a continuous stream with entire absence of pulsations. For this reason the installation of receivers solely for the purpose of damping out objectionable pulsations is not necessary and receivers need only be installed where the load fluctuates considerably and air storage is required. Because of complete absence of reciprocating parts the operation is entirely smooth and free from vibration.

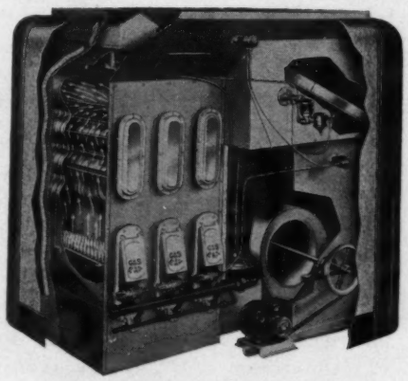
For pressures above 50 lbs. gauge, multi-stage compression is more efficient, and because staging can be commercially applied to the rotary type machine at costs comparable to single stage reciprocating compressors, all rotary compressors of the multicellular type are two-stage for 60 lbs. to 100 lbs. discharge pressure. Early designs connected two single stage rotary compressors of proper capacity in tandem with an intercooler between, usually located in the subbase or mounted to one side.

Within the past few years an outstanding design was perfected combining the two rotors on the same shaft and an intercooler enclosed in the same cylinder case. This development was designated the "Ro-Twin" compressor. See Fig. 1. The action of the standard 100 lbs. machine is similar to the standard rotary compressor excepting that the air or gas is compressed to about 28 lbs. in the low pressure cylinder, then discharging through the intercooler to the high pressure cylinder



H. P. Mueller, president, watches engineers testing deliveries of Mueller Air Conditioning Furnaces and Climator Blowers.

WHEN CLOTHES MAKE THE MAN



MUELLER GAS ERA CLIMATROL

This complete gas-fired winter air conditioning system brings a distinct advance to home heating. Illustration above is cut-away view of insulated cabinet showing compactness and accessibility of every Mueller element. Note fire travel through Gas Era Steel furnace sections; powerful fan which circulates pure, filtered, moistened, warm air to all room; and complete assembly of conditioning units and controls.

OF course, clothes really don't make the man any more than a stylish casing makes a good furnace. Yet that statement has survived a good many years of repetition.

The real man is found *within* the dress of good-grooming. But the man has to prove himself by his acts, not his dress. When my dad first pointed this out to me, he didn't say "acts," however, he called it character.

And when I took over, here at the Mueller Furnace Company, I soon discovered the application of this truth, insofar as heating equipment is concerned. I learned that heating equipment, like men, must first of all have character if it hopes to survive in public favor. Character to give service; character that can be depended upon. And that character must start with the ideals—the principles of the men who run the business. It's time enough to consider attractive dress, after true worth has been established.

And we've considered attractive dress in our new line of heating and air-conditioning equipment. Don't doubt that for one minute. People tell us our 1937 line is the smartest in the industry. But, more important to us, is the fact that they also tell us the new line has the fine character which enabled Mueller products to out-perform those which are built down to a price.

See the new Mueller line of coal, oil and gas fired furnaces and boilers. Discover the opportunities it offers for fast profits. Come to Mueller for true facts about home air conditioning equipment. Write today for Catalogue G-4.

H. P. Mueller

PRESIDENT

MUELLER-MILWAUKEE

L. J. MUELLER FURNACE COMPANY, Milwaukee, Wisconsin, *Manufacturers of Coal, Oil, Gas Furnaces and Boilers, for homes, schools, churches. Complete air conditioning equipment. Registers and fittings.*

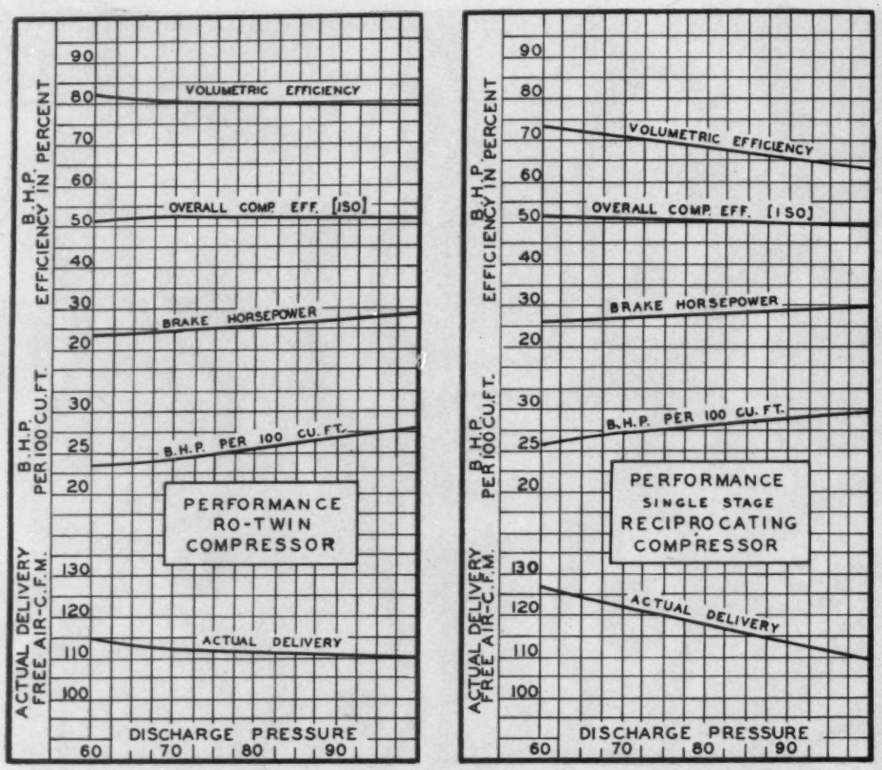


FIG. 2. Comparison of the characteristics of the Ro-Twin and reciprocating compressors.

and finally discharging to the line.

A comparison of the characteristics of the Ro-Twin compressor and conventional competitive reciprocating compressors is shown in Fig. 2.

The rotary compressor lends itself admirably to direct connection of electric driving motors or vertical multi-cylinder internal combustion engines, and while belted units are available, by far the greater majority are of the direct-connected type. Because of the unusually high capacity in comparison to their size, the rotary compressors are compact and require very little floor space.

Some Experiences in Selling High Priced Gas to Industry

• **NATHAN SCHOFER, Illinois Northern Utilities Co., Dixon, Ill., in a report given before the Midwest Industrial Sales Council of the American Gas Association, Chicago, Ill., January 22, 1937.—(Abstract by G A S).**

THE Illinois Northern Utilities Co., which operates in the northwestern portion of Illinois, manufactures and sells gas to 12 communities ranging in size from 10,000 to 2,000 inhabitants. The company has five gas plants, the average daily sendouts of the largest being 800 M and of the smallest down to 50 M. Instead of such customary rates as $.02, $.03, $.04, $.05 per therm, the company deals with rates of $.11 to $.20 per therm.

There is no one in the sales department who is trained to contact industrial or commercial gas customers. When any customer has difficulty with gas equipment, the Gas Engineering department is called on for help.

Following is a typical example of the experiences the company has had with some of its customers.

The customer in question manufactures copper wire. After a prolonged shutdown, they started production, bringing in equipment from some of their other plants. They had four small retorts for annealing fine wire, each fired with two gas burners. As soon as they got their first month's bill, they blasted the company's local representatives and threatened to put in oil. The engineering department was called upon for assistance, and upon investigation found (1) the burners were of the type used in boilers; that is, they burned with a long flame, resulting in very incomplete combustion, (2) the whole setting was of heavy firebrick construction. To remedy this, two box burners were procured and installed for the customer.

Although the new burners used only half as much gas as the old ones, the retorts heated up in almost the same time as before. The customer was persuaded to rebuild three retorts, discarding the fourth, and use insulating brick with a sheet iron casing. He was also persuaded to change the method of operation so that he now ran 9 batches through the retorts and used half the gas that was used previously in annealing four batches.

Five tinning pots, formerly electrically underfired, were converted to gas. As the customer refused to consider immersion heating, a special burner using blast tips with high pressure gas was built. Soon all the electric units were replaced. According to the customer's own data the electricity used for heating up and operating for eight hours amounted to 1700 kw. The gas used for the same operation was 4000 cu. ft. of 565 B.t.u. gas, giving gas an overall efficiency of just twice that of electricity.

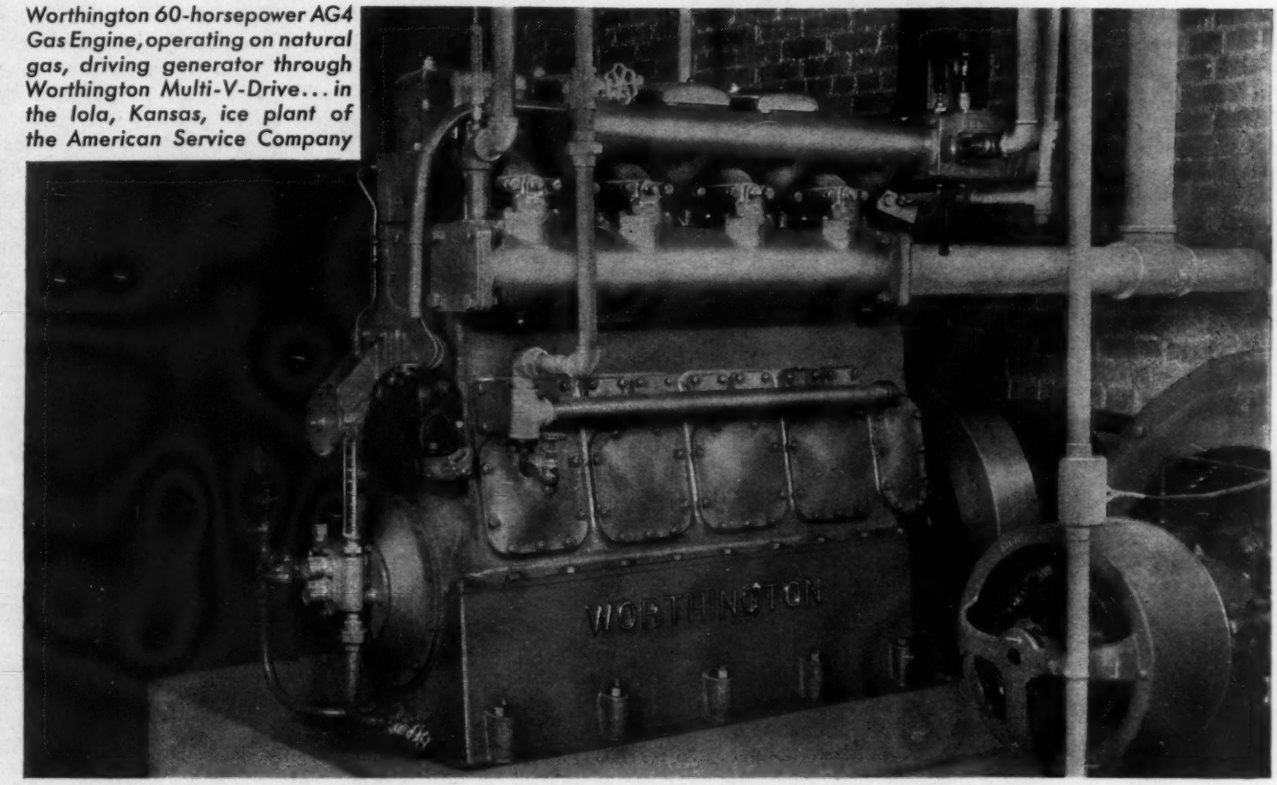
At the same plant were four wax tanks, known as finishing tanks, through which the covered wire passed. These had been heated with electric immersion units. The customer was persuaded to weld a 5-inch pipe through the center along the length, with a riser at the discharge end. The gas company put in an I. H. 100 Buzzer immersion burner with a Partlow Thermostat. After a month's trial on one tank, the customer gave approval on the other three. All four are now gas heated. According to the customer's data the electric cost was $.10 per hour, the gas is $.04 per hour. The tanks are always kept hot.

The wax, which the customer received in drums, had to be melted. Kerosene had been used to underfire the two tanks. It was proposed to install three immersion burners on the larger tank and two on the smaller one. The customer granted approval on this method, but before installation the manager changed his mind and insisted on underfiring. The burners were bolted onto a plate at the end and simply underfired. The results were (1) reduced heating-up time, (2) elimination of a nuisance in maintaining the kerosene burners.

During this time the company installed a number of small burners throughout the plant and a gas-fired multi-coil water heater for showers. At the present time there is under consideration a plan to heat four large saturation tanks with a McKee gas-fired dowtherm boiler. Recently an order for two more immersion burners and thermostats for two additional tanks was received.

This customer's consumption has shown a steady increase from practically nothing to 550 M per month.

Worthington 60-horsepower AG4 Gas Engine, operating on natural gas, driving generator through Worthington Multi-V-Drive... in the Iola, Kansas, ice plant of the American Service Company



Another Worthington Gas Engine has reduced power costs for its owners . . . . *contributing substantially to profitable ice plant operation*

This experience of the American Service Company is typical of Worthington engine economy, consistently demonstrated in a wide range of applications. In some plants, power costs have been reduced more than 50%.

POWER SAVINGS which directly augment your customers' profits provide the best possible basis upon which you can build your gas sales and improve your load factor. A Worthington engineer will be glad to work with you on any gas engine power application.

GAS ENGINES FOR CONTINUOUS HEAVY DUTY
30 to 1800 horsepower
Medium speeds . . . every type of drive

Other Worthington Products:

REFRIGERATION EQUIPMENT
ICE MANUFACTURING EQUIPMENT
AIR CONDITIONING EQUIPMENT
(Complete installations or individual equipment)
AIR AND GAS COMPRESSORS
CENTRIFUGAL PUMPS
DEEP WELL TURBINE PUMPS
POWER PUMPS
STEAM PUMPS
MULTI-V-BELT DRIVES

WORTHINGTON PUMP AND MACHINERY CORPORATION

General Offices: **HARRISON, NEW JERSEY** • *Branch Offices and Representatives in Principal Cities throughout the World*

WORTHINGTON

ATLANTA BOSTON BUFFALO CHICAGO CINCINNATI CLEVELAND DALLAS DENVER DETROIT EL PASO HOUSTON KANSAS CITY LOS ANGELES NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH ST. LOUIS ST. PAUL SAN FRANCISCO SEATTLE TULSA WASHINGTON

4E7-7A

As a result of this and similar activities during the past four years the company has increased its industrial gas sales on new equipment by about 2,000 M cu. ft. per month. This does not include the increased use of gas on equipment already on the lines. The company hopes to add another 2,000 M on new equipment this year.

There is no fear of electricity as a competitor except in certain high temp. applications. Oil and even coal have been successfully displaced. Not a single industrial gas application has been lost to any other fuel in the past four years. Fundamental progress has been made in the air-conditioning field.

In order to sell industrial gas and keep it sold, certain policies have been set up. There is no compromise on the quality of equipment. Every effort is made to see that the customer uses the most efficient equipment available. The company is not concerned with making a merchandising profit on the equipment sold. Upon making a sale, the manufacturer's list price is charged. If the manufacturer's representative makes the sale, the company is perfectly content to remain the customer's advisor. Under no conditions is the customer misled. If the application is experimental, the customer knows it and the company has his complete co-operation.

Training Service Men In the Use of Gas Boiler Controls

● **C. P. PERKINS and CHAS. CONSTERDINE, Pacific Gas and Electric Co., San Francisco, Calif., in paper to Sub-Committee on Employee Training for Customer Utilization Work, Pacic Coast Gas Association Spring Technical Conference, Los Angeles, Calif., March 18-19, 1937.—(Abstract by G A S).**

THE number of requests for service on steam or hot water heating systems, when compared to the total number of service calls are so few, particularly residential districts, that it is wholly impractical to attempt to school every serviceman in this specialized branch of customer service.

The instruction was divided into four lessons, two of one hour duration each and two of two hours each. Classes consisted of 12 or 16 servicemen at a time. The first lesson was repeated on consecutive days until all servicemen had received that part of the instruction; then the other three classes followed in a like manner. It was found that much more progress was made and greater interest was maintained if the classes were held in the early morning before the men went out on their routes. Lesson subjects were:

1. Wiring diagrams in color.
2. Purpose and operation of limit controls.
3. Gas operated diaphragm gas valves.
4. Low pressure steam boilers.

First Lesson:—A one hour period was spent in studying wiring diagrams of the more common installations. All the automatic controls that would be found on a one boiler job, with the necessary wiring in color, corresponding to the wire color code as designed by the control manufacturer, were shown on the drawings. Fig. 1 shows a typical diagram, in color, 30 inches by 48 inches. Four of these were mounted on blackboards and an instructor assigned to each. Each class of 12 or 16 men, depending on the amount of regular work to be done on that particular morning, was divided into four equal groups. One group was assigned to each blackboard. Instruction and discussion then continued for 10 minutes after which the groups changed places, the instructor remaining at his board. After the second 10 minutes they changed again and so on until each of the four groups had had 10 minutes of instruction on each of the four boards. The remaining 20 minutes of the hour were reserved for general discussion of points not thoroughly understood.

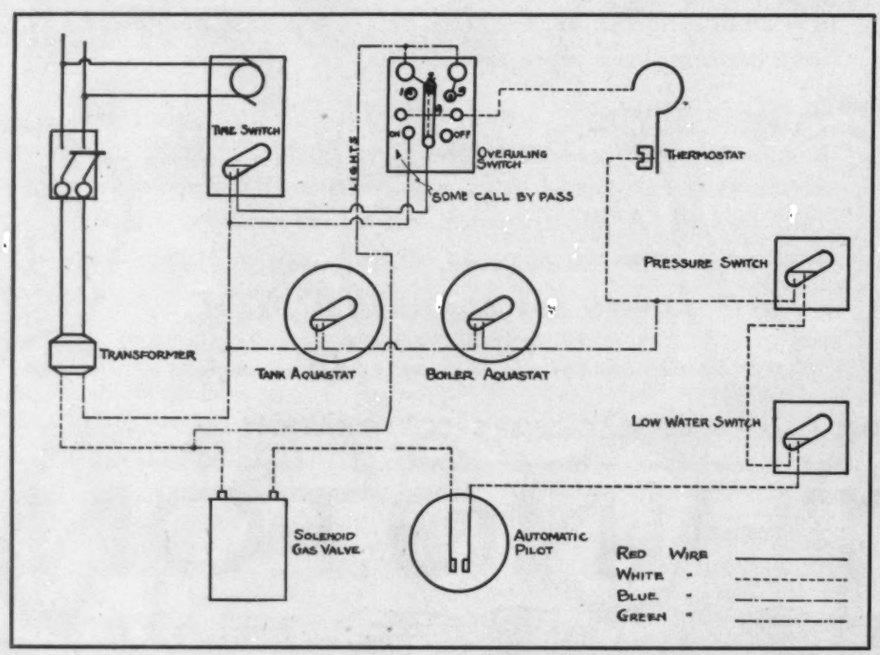


FIG. 1. Two wire single boiler.

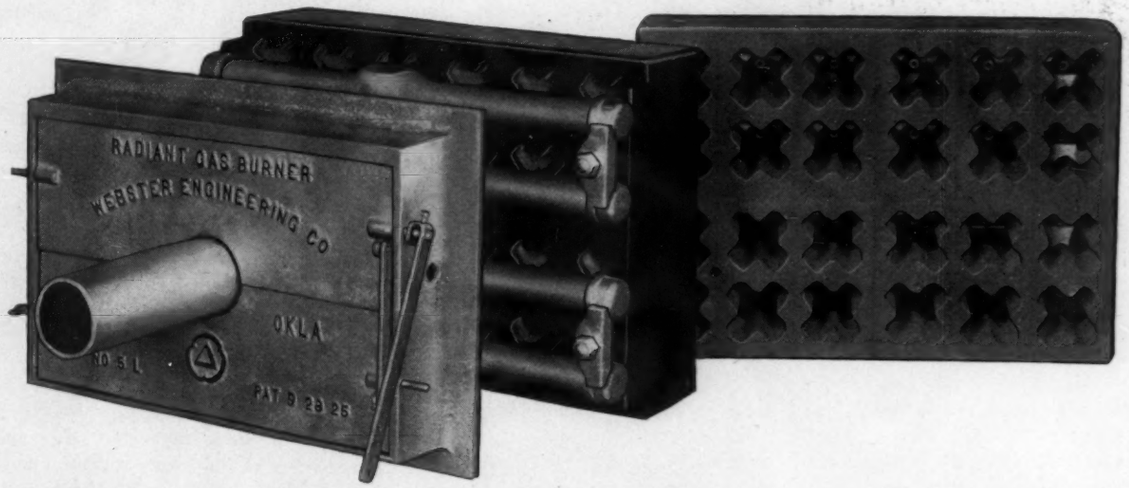
Second Lesson:—This lesson, covering a two-hour period, was used in studying the operation of and purposes for, automatic controls of the types that are more commonly used on low pressure steam boilers. These included thermostats, time switches, pressure controls, aquastats, low water controls, automatic pilots, solenoid gas valves, overruling switches, etc. Particular emphasis was placed on what to do to restore service in an emergency, so that inconveniences to the consumer would be minimized. This usually requires a temporary repair to be followed by permanent repair or replacement at some later time.

In this lesson it was discovered that the student received more useful information and a more complete understanding of a control if he were permitted to handle and disassemble it himself. As the class period did not allow time for this, the class room and equipment was made accessible to the men at other times.

Third Lesson:—This one hour lesson was spent in studying large scale drawings in color together with an actual demonstration of gas operated diaphragm gas valves. To an inexperienced serviceman, on first inspection, these valves seem most mysterious, but actually they are quite simple when the operating principle is understood.

Fourth Lesson:—A two-hour period was given to instruction, demonstration and discussion of two small gas designed steam boilers. See Fig. 2. The smaller one is electrically operated, using the controls and wiring installation as shown in Fig. 1. This setup represents a typical one boiler installation. The

WEBSTER—



RADIANT LOW PRESSURE GAS BURNERS

A burner that will fit into the average boiler —maintain capacity—operate easily and efficiently.

This burner has consistently proven its leadership, in the application of gas fuel to solid-fuel boilers, because — The separate burner block and louvre give the flexibility of capacity and ease of installation. The multiplicity of jets give the ease of operation. Multiple jets, combined with the peculiar shaped mixing tunnel and the Surface Combustion principle of ignition, give the highest efficiency.

RUGGED CONSTRUCTION, SUPERIOR PERFORMANCE and CONTINUITY of EFFICIENT OPERATION, make it a RELIABLE gas burner for boiler firing.

Write for complete dimensions and capacities

THE WEBSTER ENGINEERING COMPANY

TULSA, OKLAHOMA

Division of

THE SURFACE COMBUSTION CORPORATION **TOLEDO, OHIO**

— Pacific Coast Distributors —

Natural Gas Equipment, Inc. — Los Angeles — San Francisco

F. J. Evans Engineering Co.—Birmingham; Gas & Heating Specialty Co.—Dallas; Mechanical Equipment Co.—Houston.

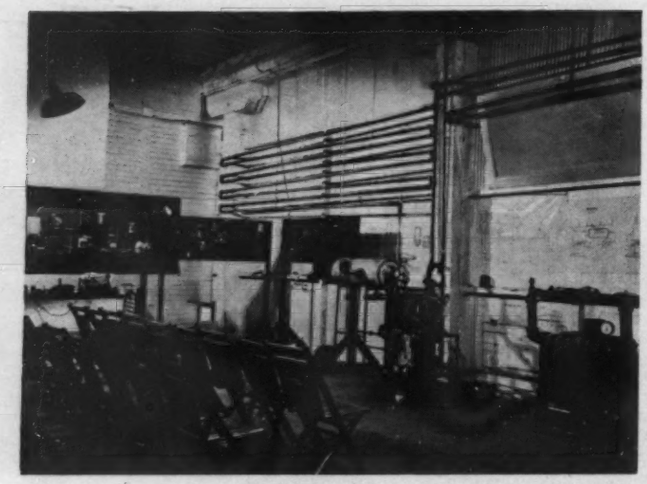


FIG. 2. General view of class room showing two boilers, improvised radiation, wall diagrams of principle being taught, control board with mechanism embodying the principle.

larger boiler is non-electrically controlled, using a gas operated gas valve with the necessary controls. Both boilers are fitted with proper steam and return pipe connections and are installed to operate together or separately. They supply steam to a large radiator, made of 200 ft. of 1¼ inch galvanized pipe. This can be seen clearly in Fig. 2.

At the completion of the four lessons, it was decided to hold one more meeting for a practical test to reveal what the men had learned. As in the preceding lessons, the classes were kept small, consisting of not more than 16 men. These were divided into four equal groups as before and a problem assigned to each group. No instructor was with them for this test. Fifteen minutes were allowed on each of four problems. After each fifteen minute period, groups changed until each group had worked on each problem.

The four problems were typical steam boiler complaints such as would arise in an average day's work. Prior to the beginning of each class, controls were tampered with purposely, making them inoperative by some such means as loose wire terminals, dirty contact points, pilot failure, low water in boiler, thermostats out of calibration, switch indicating lights improperly installed, time switch set slow, gas shut off, etc. After "service" had been restored by each group, the test device was made inoperative again for the following group. Much practical information was gained by the students from this test and needless to say, interest was keen.

Lubrication of Natural Gas Engines and Compressors

● **From LUBRICATION Magazine, issue of January, 1937, entitled "Lubrication of Natural Gas Machinery," published by The Texas Company, 135 East 42nd Street, New York City.—(Abstract by G A S).**

THE selection of lubricants for a gas engine plant should be made strictly on the basis of quality, involving chemical characteristics to insure properly refined oils containing no impurities; and on viscosity, to insure the proper grade. Neither color nor density qualifies as special properties in the selection of such an oil, although color may be significant of the degree of refinement.

Excessive friction may result from the use of an oil of either too high or too low viscosity. Too high a viscosity will give a good film but the internal friction in the oil may be excessive; conversely, if the viscosity is too low the film may be broken. Viscosity, therefore, is of supreme importance in the selection of a lubricant, as it is a measure of the ability of the oil to maintain the proper film under the existing conditions of speed, pressure and temperature.

Cylinder liners and piston rings, as those parts subjected to the most extreme operating conditions, will naturally require the most positive lubrication for their protection. One condition in particular which is entirely foreign to other types of internal combustion engine fuels, involves entrained air. This causes excessive heating of the cylinders and pistons from pre-ignition and quick burning of the fuel, thereby destroying the lubricating film on the cylinder walls.

Another factor which affects the lubrication of gas engines in oil field service involves inadequate cooling water systems, and the use of untreated water containing a large percentage of insoluble salts, having a tendency to deposit scale and form an insulating coating in the water jackets of the engine. This will result in insufficient cooling and excessive operating temperatures.

Under uncontrollable adverse conditions, however, the high temperatures encountered should be taken into account when selecting the cylinder lubricant, with prior consideration being given to low carbon residue and an ability to resist breakdown. Oil of low carbon residue assures cleaner cylinders, freedom from stuck rings, better engine operation, a minimum of wear and low maintenance cost. Again, in selecting the lubricant for cylinders, consideration must be given to the condition of the fuel. Should it contain mineral seal oil, moisture, or a percentage of sulphur, a compounded lubricant is preferred.

Continuous renewal of the lubricating film, especially where a mechanical force feed lubricator is employed, is added assurance that the above-mentioned conditions will be met, for it enables restoration of lubricant before vaporization or breakdown losses occur sufficiently to develop actual metallic contact. This can only be positively assured, however, provided the oil is of the proper viscosity to resist the reducing effects of heat.

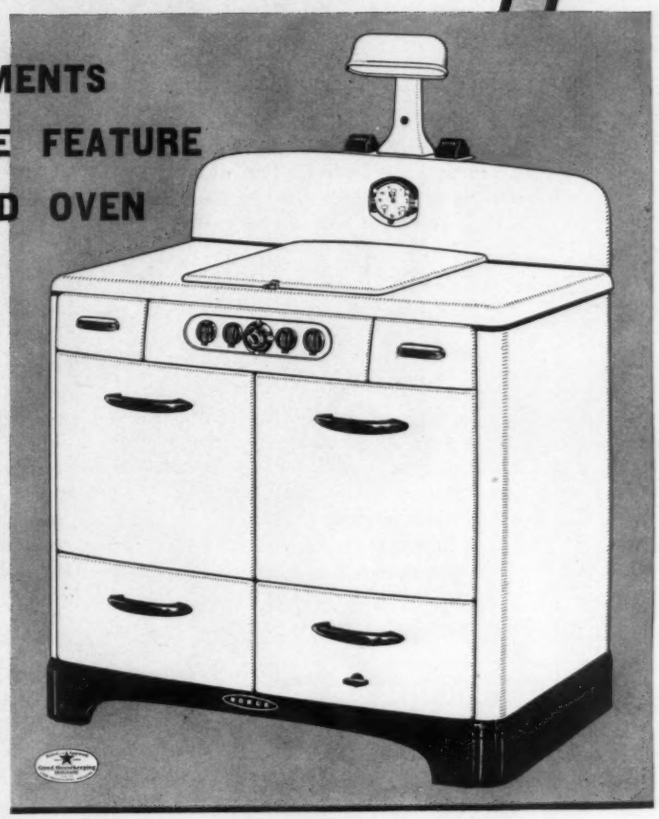
The oil feeds should be carefully controlled. Otherwise an excess of oil fed to the cylinders may bring about leaky valves due to a certain amount of oil becoming carbonized thereon. Likewise, an excess delivered to the piston rod stuffing box may cause leakage and improper functioning of the packing due to abnormal wear. Carbonaceous matter, being relatively sticky in the early stages of its formation, will also tend to adhere to the piston rings, thereby causing them to become inoperative; furthermore, it will tend to destroy the lubricating film and result in scored cylinders.

The horizontal reciprocating compressor, as widely used in casinghead gasoline manufacture, presents certain conditions of operation which may readily develop difficulties in lubrication. On the first stage, due to the vacuum which is maintained in the cylinder, there will be a tendency to draw oil off the piston rod as this oil is carried along the rod from the crankcase. To remedy this the piston rod stuffing boxes must be kept tight and in first class condition at all times.

In compression units used on the second stage, the rich gasoline vapors may condense and cause wash-off of the oil film on the cylinder walls, the liquid content tending to cut or dissolve the lubricating film, especially if this latter is a straight mineral product. Com-

Again Norge Leads!

WITH FURTHER IMPROVEMENTS IN THE GREATEST GAS RANGE FEATURE SINCE THE FIRST INSULATED OVEN

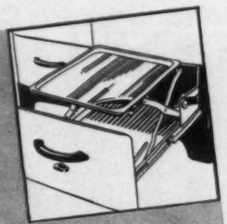


IN THE NEW Norge Gas Ranges the famous *Concentrator* burner is further improved to make top stove cooking even easier—to save even more fuel—and to be an even more impressive talking point.

The New Norge *Concentrator* Gas Ranges are making an instant hit everywhere. And according to dealers already in the Norge profit parade the sales promotion and advertising plan backing up this great line of gas ranges is the largest, most practical and resultful they have ever seen.

Do something really important *for yourself* today—write for complete details about the Norge dealership proposition. It's *easy* to be a Norge dealer, because of new liberal finance plans.

NORGE DIVISION *Borg-Warner Corporation*
606-670 E. Woodbridge St., Detroit, Michigan



THE NORGE BROILATOR

Sell your prospect more delicious meals as well as greater economy. The Norge Broilator brings out hidden flavor in meats, makes it easy for every woman to prepare tender, broiled steaks and chops.

Another Norge Vital Value that Sells Itself!

See THE DIFFERENCE! *Sell* THE DIFFERENCE!

Pocket THE DIFFERENCE!

BE A NORGE DEALER

GR-3 ROLLATOR REFRIGERATION (Domestic and Commercial) • GAS AND ELECTRIC RANGES WASHERS AND IRONERS • WHIRLATOR OIL BURNERS • GAS BURNERS • FINE-AIR FURNACES • COAL STOKERS • AIR CONDITIONING • CIRCULATOR ROOM HEATERS

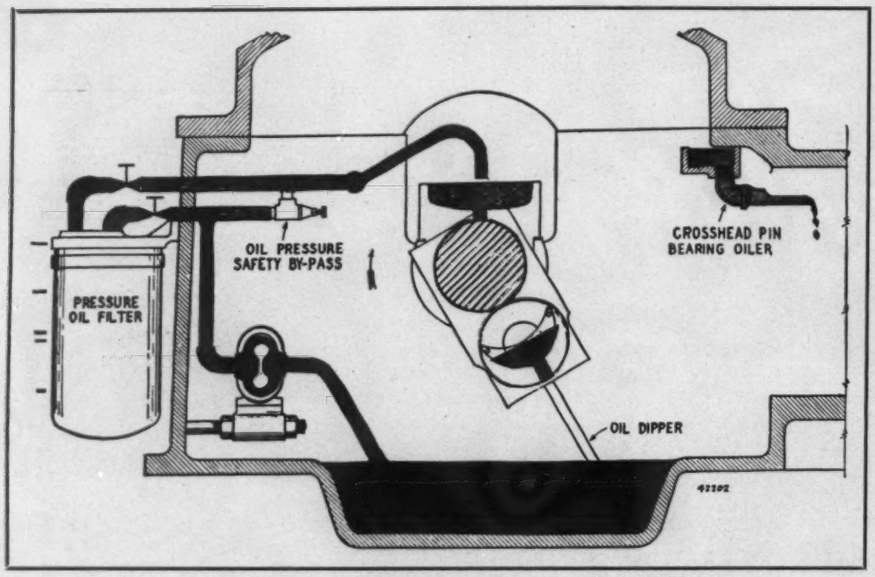


FIG. 1. The oiling system designed for gas engine driven compressor. A gear pump takes oil from the crankcase, forces it through the filter and delivers an excess of clean oil to each main bearing cap. Overflow from these caps on to crank cheeks is picked up by the oil catchers at each end of the hollow crankpins and is thrown on to the crankpin bearings by centrifugal force.

pounded oils are preferred for cylinder lubrication of such machines; the same holds true where gas containing an appreciable amount of sulfur must be handled. To further assist in the maintenance of proper cylinder lubrication, some compressors are furnished with a lubricating connection not only into the cylinder itself, but also an extra connection into the gas intake port so that the suction valves are lubricated. Additional lubricant is thereby taken into the cylinder in finely atomized state along with the gas itself. Fig. 1 shows a typical oiling system.

Where sulfur may exist in the corrosive form, the effect upon compressor parts must be considered, and the lubricant chosen for its protective as well as its lubricating properties.

The amount of fixed oil compound to use in a compressor oil will, in general, be governed by the so-called moisture content of the gas. Normally 3 per cent of lard oil will suffice to promote maintenance of an adequate film of lubricant, provided it is properly compounded with a highly refined mineral oil. On the other hand, when the gas is excessively wet, the use of from 10 to 20 per cent of rapeseed oil in compound has been found to promote effective lubrication, especially when used with a comparatively heavy mineral oil base.

The viscosity of this latter should be studied with due regard to the compression pressures, varying from 500 to 750 seconds Saybolt at 100 degrees Fahr. Use of the heavier viscosity has been found to promote economy in the amount required. Furthermore, it can be assumed to be more adhesive, especially under casinghead gasoline extraction operations, or wherever a considerable amount of liquid gas is present or developed in the course of compression. One should guard against the use of oils heavier than 750 seconds viscosity, however, due to the possibility of formation of deposits on cylinder walls and valves which might lead to retarded valve action and excessive wear of cylinder walls and piston rings.

Lubrication of gas compressor cylinders operating on dry gas will be essentially the same as where air is being handled. Normally temperatures will not exceed 350 to 400 degrees Fahr. For this reason heavy bodied oils are not required, a straight mineral 300 to 500 viscosity product being suitable. It is essential to remember, however, that the oil must always be of the highest degree of refinement, otherwise objectionable carbon deposits and gummy matter may develop, especially where an oil of the heavier viscosity is used. Where the gas being compressed is free from impurities, the sparing use of a properly refined straight mineral oil will insure efficient operation indefinitely.

The mechanical force feed lubricator has been proved a most adequate means of delivering oil to compressor cylinders, in as nearly as possible the right amount, commensurate with the nature of the gas, to insure dependable and continuous operation.

Columbia Gas Practice Courses to Continue

COURSES in American gas practice, which have been offered since 1925 by the Home Study department of Columbia University and sponsored by the American Gas Association, will not be affected by the recent action of the University trustees discontinuing organized home study at Columbia.

Because of the active interest of the gas industry in these courses, they will be transferred to the Extension Division of the University. Professor J. J. Morgan of the chemical engineering department will continue to conduct the courses, and instruction will be by mail as heretofore.

The courses are now offered in two parts: Part I, production of manufactured gas; Part II, distribution and utilization of city gas. The latter is suitable for employees of companies distributing natural gas or mixed gas as well as straight manufactured gas.

Enrollments are accepted at any time and may be for either Part I or Part II alone. Further information will be furnished by Kurwin R. Boyes, secretary, American Gas Association, 420 Lexington avenue, New York City, or Professor J. J. Morgan, Department of Chemical Engineering, Columbia University, New York City.

■ ■

Boston Company Announces Personnel Changes

The Boston Consolidated Gas Co., Boston, Mass., recently named Frank D. Cadwallader to a newly created vice-presidency, in charge of public relations. Mr. Cadwallader for 10 years was vice-president in charge of sales.

J. J. Quinn has been appointed sales manager in direct charge of all sales operations. He was formerly assistant to Mr. Cadwallader.

E. H. Eacker has been appointed assistant to E. M. Farnsworth, vice-president and general manager. Mr. Eacker formerly was in charge of the Charlestown Electric division and assistant to F. M. Goodwin, vice-president in charge of distribution.

R. W. Menard, who is head of the application department, has been made, in addition, superintendent of the investigation department.

■ ■

North Shore Gas Co. Rate Reduction Granted

Permission to file reduced rates for gas used for water and space heating has been granted to North Shore Gas Co., Chicago, Ill., by the Illinois Commerce Commission. The reduction would amount to about $47,000 a year for suburban consumers. The company serves a territory of about 275 square miles north of Chicago.

■ ■

New La Blanca Field Line

Furnishing an outlet for gas from wells in the recently developed La Blanca field, northeast of Edinburg, Texas, a pipe line has been constructed from the field to the Mercedes Union Sulphur line, which joins the Rio Grande Valley Gas Co.'s main in Mercedes.

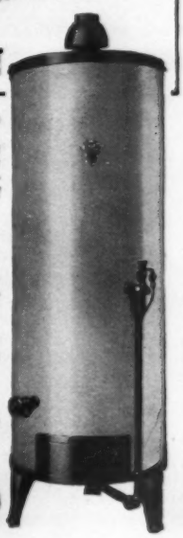
CHAMP
in its own right

AGP "EMPIRE" IDEAL

The World's Most Beautiful Gas Boiler

Here's the boiler that packs the BIGGEST SELLING WALLOP FOR YOU. It's clean, compact, completely automatic. It's dependable and economical. It's advertised right in your own territory and backed by the best-known name in gas-fired equipment. It's the AGP "EMPIRE" IDEAL — the world's most beautiful Gas Boiler . . . in models for every size of home . . . for steam or hot water heating. *Right now,* AGP sales-helps on boilers and the complete line of AGP Convertors are waiting to help you drive home the winning sales-wallop in your battle for heating load. Write today for details.

FEATURED FOR THE *Golden Faucet* CONTEST



AGP GAS-FIRED AUTOMATIC STORAGE WATER HEATERS *in sizes and types for every home and purse.*

AGP REGULAR—*5 sizes; 20 to 75 gal.*

THE DICTATOR (*illustrated*) *4 sizes; 15 to 40 gal.*

AGP CLIPPER—*5 sizes; 15 to 40 gal.*

***New Mailing Campaign Sells* GAS HEATING**

Four self-mailers now ready for you . . . part of the complete AGP sales helps available. Write.

AMERICAN GAS PRODUCTS CORPORATION

DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

40 WEST 40TH STREET · NEW YORK, N.Y.

Testing and Appraising Large Volume Water Heating Installations

(Continued from Page 18)

that the heater is off and the frequency with which it cuts on and off.

Determination of Potential Market

Most of the literature relative to volume water heating has been concerned with an estimate of the potential market (1, 3, 8, 12, 13)† that is made from knowledge acquired through:

1. A survey to determine the total number of apartments.

2. Field tests to obtain the hot water demand per apartment per average day. Tests made by various investigators (4, 6, 12, 13) give divergent results, depending on location.

3. Field tests to determine the average overall efficiency of gas designed equipment (12, 13). This overall efficiency has been found to average 40 per cent if equipment is sized properly.

Competitive Gas Rates

Competitive rates (1, 2, 3, 7, 8, 12, 13) must be set to get the profitable part of the potential market. These rates are based on cost comparisons, pertinent data for which are best obtained from surveys that are part of field tests as already described. Such surveys give some knowledge of:

1. The retail price and life of the heater, which must be known in order to calculate depreciation.

2. Cost and frequency of servicing from which maintenance is calculated. The hardness of the water, high water pressure, excessive temperatures, undersizing, etc., affect life and maintenance.

Installation of Proper Equipment

Undersized equipment gives poor service, oversized units cause high standby losses and consequently high gas bills. The first step in the proper selection of equipment (1, 2, 9, 11, 13, 14) is to determine the hot water demand by:

1. Installing a water meter, such as a Trident Recording Register (see Table No. 1) whenever possible.

2. Sound estimates based on field tests run in the territory where the installation is to be made. American Gas Association methods and others, based on data obtained in the East and Middle West, give estimates that are too high for use in Southern California (see Table No. 2 on Page 19).

The second step is to choose a heater that will supply this demand. Assuming that the hot water demand per average day is 80 per cent of that for the maximum day, the American Gas Association method (13) for selecting the heater size may be used.

There then remains, in many cases, the sizing of a storage tank and the choice of a piping system. The former should be done, whenever possible, by analyzing the load curve based on the metered demand. Where metering is impossible the American Gas Association method (13) for sizing storage tanks may be used. As to the choice of a piping system the rules laid down by Howell (5) are worthy of consideration.

Operating Characteristics

Field tests lend themselves to a complete study of the operating characteristics of a system (4, 6) and therefore, provide valuable information for the handling of consumer complaints. Justifiable complaints fall into two classes, those that can be eliminated by the service man without cost to the owner, and those that should be done by a competent plumber and involve an expenditure of money. Within the first class fall complaints resulting from:

1. A gas input lower than that for which the heater was designed. Decreased gas input (4) causes a low rate of heat transfer, high stack losses, poor hot water service and increased hot water consumption. A boost in service pressure or increase in orifice size are the usual solutions. (Service pressure is often lowered by the installation of a "fuel-saving regulator" that reduces the flow of gas but also lowers the efficiency, not to be confused with regulators installed on appliances designed to operate at low pressures).

2. Excessive pilot consumption (should be 1 to 2 cu. ft. per hour per pilot).

3. Improper combustion (4) due to: (a) Excessive input to either main burner or pilot or both. (b) Insufficient primary air to either main burner or pilot or both. (c) Insufficient draft.

4. Fouled external heating surfaces that lower the rate of heat transfer and are caused by: (a) Incomplete combustion resulting in a deposition of carbon. (b) Corrosion.

5. Insufficient heater baffling that increases the sensible heat lost up the stack.

6. Excessive drafts due to: (a) Full chimney draft on the heater. (b) Im-

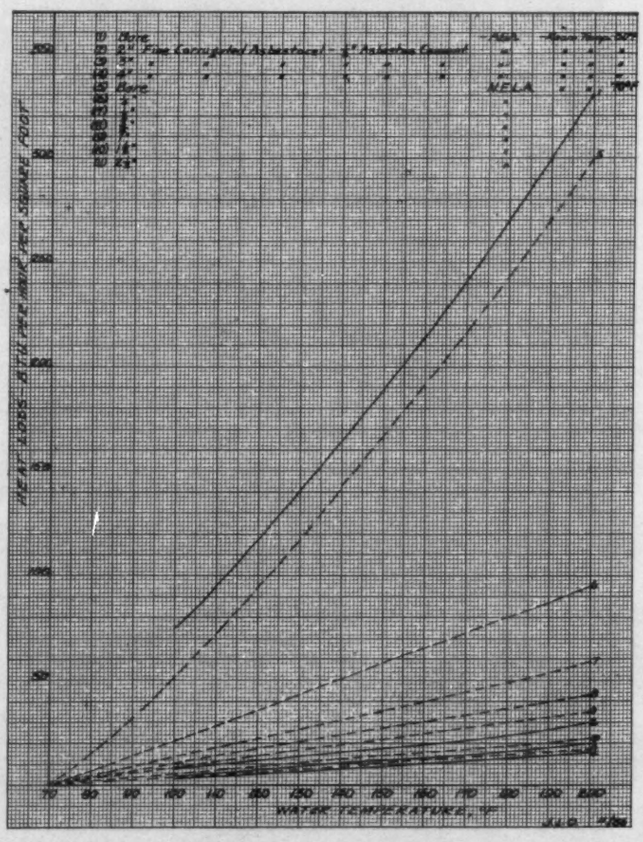


FIG. 2. Heat losses from storage tanks

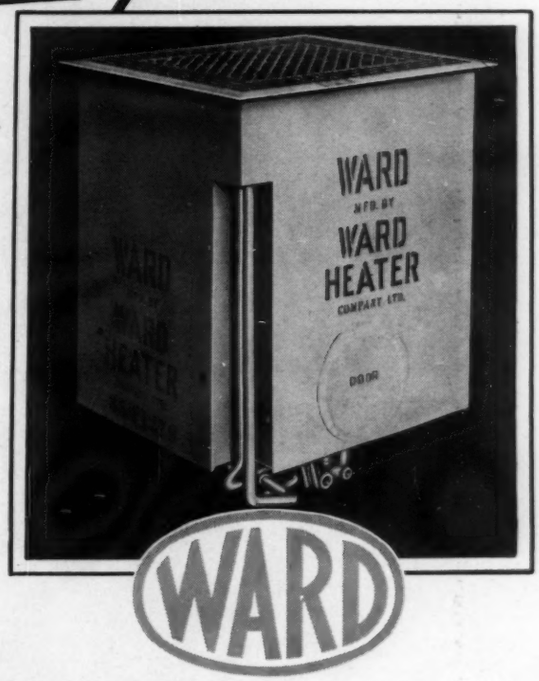
†The numbers in parenthesis appearing throught this article refer to the literature references cited below.

LITERATURE REFERENCES

(1) Alger, C. S., *Electrical West*, 76, 112 (1936).
(2) Devlin, E. J., *American Gas Association Monthly*, 15, 385 (1933).
(3) Fitch, S. B., *Gas Age-Record*, 68, 273 (1931).
(4) Howell, L. O., *Western Gas*, 10, 13 (1934).
(5) Howell, L. O., *Pacific Coast Gas Association Proceedings*, 25, 141 (1934).
(6) Johnson, H. N., *Apartment Journal*, 10, (December 1935).
(7) Long, H. J., *American Gas Association Monthly*, 15, 234 (1933).
(8) Manier, R. L., *American Gas Association Monthly*, 16, 172 (1934).
(9) Ibid, 16, 243 (1934).
(10) Manier, R. L., "Supplement to Large Volume Water Heating Committee Report," American Gas Association, 1934.
(11) Pihlman, A. A., *American Gas Association Proceedings*, 1929.
(12) Segeler, C. G., Special Industrial Service Letter No. 8, American Gas Association, (1932).
(13) "Water Heating," American Gas Association, (1930).
(14) Yost, H. B., *American Gas Journal*, 140, 34 (1934).

TO BUILD GAS SALES...REMEMBER...

Your load is as good as the appliance you sell!



One of your most important jobs is to keep your consumers sold on the fact that gas is the most economical, most efficient, fuel for heating. And one of the best ways to do that is to sell them WARD FLOOR FURNACES. Because WARDS *are* economical and efficient. More than 325,000 users in all sorts of climates (down to 40° below) testify to that.

In the community you serve there are hundreds of meters... in single story homes, stores and offices... that should be showing you better profit through installation of "WARD warmth," *automatically controlled, vented and circulated.*

Guaranteed ten years, WARDS are *permanent* equipment... built of heavy gauge Toncan iron to outlast the house in which they are installed.

Remember..."your load is as good as the appliance you sell." So sell the best... sell WARDS!

More utilities than ever are merchandising their product efficiently through the sale of ours. Why don't you write for catalog, price list and complete facts?

The 1937 WARD FLOOR FURNACE is a "complete package" ...everything sturdily built in. No assembling to do. No wires to run. Installation is simple... just drop the WARD into the floor... connect to vent and gas line, and it is ready to go to work, efficiently building your load and preserving your consumer satisfaction. An experienced gas fitter can have a WARD installed without muss or fuss in less than a day. WARD furnaces are A.G.A. tested with all accessories and controls in, *just as they are installed in the home.* No changes, nothing added to "complete package" as approved by the A. G. A. Laboratory. Guaranteed ten years...built for a lifetime.

COMPLIES WITH NATIONAL SAFETY REQUIREMENTS · AMERICAN GAS ASSOCIATION · APPROVED

the 1937 **WARD FLOOR FURNACE**

WARD HEATER CO., LTD., 1800 W. WASHINGTON, LOS ANGELES

WARD REPRESENTATIVES: J. E. Davies, Peoples Gas Bldg., Chicago • A. S. Kincaid, 2012 Harwood Ave., Dallas • F. E. Reilly, 200 Davis St., San Francisco

TABLE NO. 3. FIELD TEST DATA

Case	Satisfactory Piping Systems A	B	Unsatisfactory Piping Systems C	D
Hot Water Demand, gal.	687	2640	1720	1748
Return, gal.	839	2535	2626	651
Return				
Ratio, H. W. Demand	1.22	0.96	1.53	0.37
Hot Water Riser, Pipe Size, inches	1½	2	1½	1½
Return, Pipe Size, inches	1¼	1¼, 1, 1¼	1½	½, ¾, 1
Storage Tank Outlet Temp. °F.	130	153	145	161
Return Temp. °F.	90	103	113	87
Temp. Difference, °F.	40	50	32	74

proper installation of draft hood. (c) Unnecessary openings in the heater jacket.

7. Maladjustment of controls. (a) Thermostat setting too high or too low. (b) Steam pressure and low water control set too high or too low. (c) Throttling control valve throttles the gas flow when steam pressure is either too low or too high.

The second class includes complaints arising from:

1. "Limed" heating surfaces (6).

2. Unsatisfactory operation of controls. (a) Thermostat in wrong location (4). (b) Safety pilot gas shut-off out of order. (c) Gas control snap valve diaphragm leaking. (d) Pressure relief valve limed or leaking. (e) Vacuum-pressure relief valve too small or incorrectly adjusted.

3. Poor insulation of storage tanks (6, 13). Field tests in this territory have shown that, as a rule, storage tanks are fairly well insulated:

Case	Insulation Material	Thickness	Estimated Radiation Loss
A*	Air-cel asbestos	½ in.	13 %
B	Magnesia block	1¼ in.	2.2%
C**	Magnesia block	1 in.	2.1%
D	Magnesia block	1 in.	1.8%
E	Air-cel asbestos	1 in.	2.6%
F	Magnesia block	1½ in.	2.0%

*About one-quarter of tank bare.
**Additional 1¼ inch of asbestos cement on ends.

4. Haphazard piping and faulty fittings (4, 5). (a) Undersized piping resulting in poor circulation, low faucet temperatures and a high storage tank outlet temperature. (b) Poor choice of piping system. Field test data is shown in Table No. 3.

5. Lack of insulation on piping (1, 4). Field tests indicate that about 35 per cent of the total heat input is lost from the piping which has been found in the majority of cases to be uninsulated.

San Francisco Again Defeats Move For Municipal Electric System

By AGNES BARRELL

Staff Correspondent

THE people of San Francisco, Calif., have once again turned their thumbs down decisively on the issue of public ownership of the electric distributing facilities now supplying the city with service. The election involving the issuing of $50,000,000 in revenue bonds to permit the City of San Francisco to buy the Pacific Gas and Electric Co. distributing system was defeated by a vote of 77,614 to 65,688.

In view of the presence on the ballot of measures which brought out nearly the full strength of the city's labor vote, the defeat of the power bond issue is looked upon as an unusually important victory, as the great majority of the labor vote was favorable to the power bonds. Had this proposal been presented at a general election when a much larger percentage of the registered vote would have been cast, an even more impressive majority would have been piled up against the power bonds, in the opinion of most political observers.

Insistence by Secretary of the Interior Ickes that the city should comply literally with the provisions of the Raker Act under which the Hetch Hetchy land grant was made, and which specifies that the right to distribute power generated by city-owned plants should not be granted to any private corporation, was responsible for the placing upon the ballot at this special election.

Since the completion of the Hetch Hetchy power plant, the output has been distributed by Pacific Gas and Electric Co. under an agency contract which has paid the city an average of $2,175,000 per year. Many lawyers had disagreed as to the validity of this contract, some maintaining that it is in full compliance with the Raker Act provisions, and others maintaining that it is a subterfuge and an evasion of the Raker Act.

Secretary Ickes has ruled that it is an evasion and a threat that the contract with the Pacific Gas and Electric Co. would be dissolved by order of the federal government compelled the San Francisco Utilities Department to evolve a plan to be voted upon.

The matter is not ended even though the voters have indicated their satisfaction with the present arrangements and an amendment of the Raker Act has been suggested from many quarters. It has been pointed out that on such federal projects as Boulder Dam, Bonneville, Grand Coulee, and T. V. A., power is sold to private corporations. It is pointed out also that in Yosemite Park, in which the Hetch Hetchy grant is located, the Department of the Interior is itself selling surplus output of its Yosemite Valley plant to a private corporation. Only in the case of San Francisco is the effort being made to force a community into public ownership of a distributing system against its will.

Immediately after the election Ickes warned the city that unless action was taken within 15 days to bring about strict compliance with the Raker Act as he interpreted it, he would ask the Attorney General to proceed with the abrogation of the Pacific Gas and Electric Co. agency contract. This would mean the loss to the city of the present income of more than $2,000,000 annually and would, of course, create a substantial increase in the tax rate.

Opinion as to the proper procedure is divided in San Francisco. Seemingly a majority accept the threat of the Secretary of the Interior at its face value and favor his turning the matter over to the Attorney General. They believe that a different interpretation of the law might be achieved and even if this is not done, they feel that it would be better to have the matter taken into the courts and settled for all time.

■ ■

Herbert Wellington, Brooklyn Union Treasurer, Dies

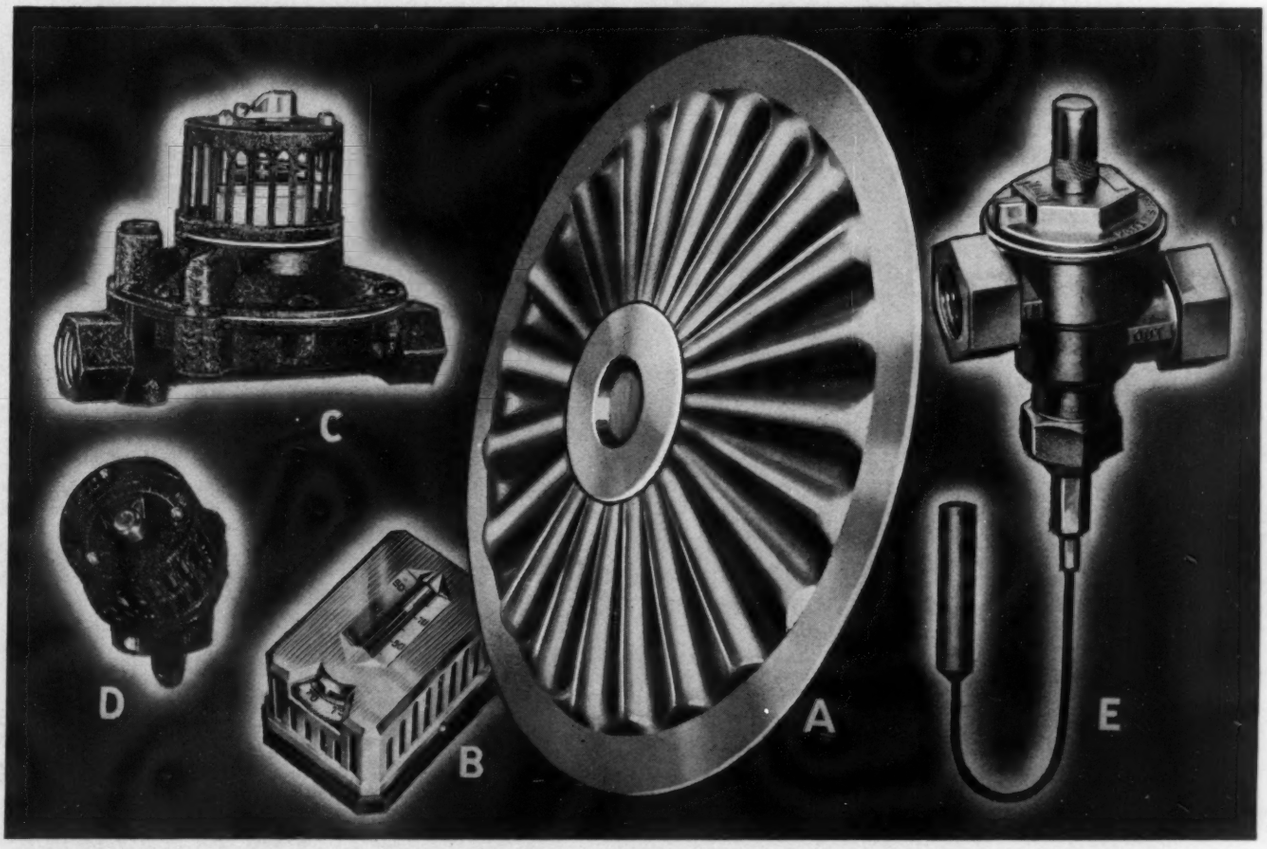
Herbert Wellington, treasurer of The Brooklyn Union Gas Co., Brooklyn, N. Y., died recently in Philadelphia, following a short illness. He joined the company in 1915 as assistant treasurer, and in 1927 was elected treasurer. Before joining the utility company he was assistant cashier for the Farmers Loan & Trust Co., New York City, treasurer of the Franklin Trust Co., Brooklyn, and vice-president of the International Trust Co., Boston.

■ ■

Propose New Palestine Line

Utilities Natural Gas Co., which has been granted a 25-year franchise to furnish natural gas to Palestine, Texas, is considering construction of a 10-mile pipe line from the Long Lake field. United Gas System now supplies the town from the Waskom field, near the Texas-Louisiana state line.

THE *Best Salesmen* YOUR HEATERS CAN HAVE ARE KLIXON ALL-GAS CONTROLS



A. A simple Spencer Thermostatic Disc operates all Klixon controls. It replaces all complicated parts—magnets, toggles, relays, bellows — makes the controls simpler, smaller, *more foolproof.*

B. The deluxe Klixon wall thermostat for remote control. Has enclosed thermometer. Several attractive finishes.

C. Klixon integral control. Thermostat is mounted on diaphragm valve. An unusually low cost installation.

D. The Klixon wall thermostat for remote control. Small, compact, easy to install. Comes in art brown finish.

E. Klixon pilot shut-off valve for pilot light protection. Comes with either automatic or manual resetting device.

KLIXON

TRADE MARK REG. U.S. PAT. OFF.

Heaters get a two-way sales lift from Klixon gas-acuated controls. First, they make space heaters automatic, safe—eliminate the human factor. They insure even, healthful, *economical* heat — performance that customers want.

Second, you're off on the right foot with the gas men when you use these Klixon controls. For Klixon controls are gas-actuated — non-electric. The type that gas companies can service themselves. The type they prefer to sell.

Simple and compact, these controls give positive, snap-acting operation—snap-acting because they are actuated by the Spencer Disc, a vibration-proof thermostatic disc that *snaps* "on" and "off" the instant action is required.

Klixon controls can be used with any type of space heater. They are economical to install and the complete line will meet any of your demands. Send for bulletin.

SPENCER THERMOSTAT COMPANY, ATTLEBORO, MASS.

JOHN J. NOVY

CARL B. NAGLER

PHILLIP E. EDDY

Peoples Gas Light Men Promoted

PHILLIP E. EDDY, for some time operating engineer for The Peoples Gas Light and Coke Co., Chicago, Ill., has been appointed assistant to the vice-president in charge of customers' services. He joined the company many years ago, and was promoted from post to post until in 1924 he was placed in charge at the South Station. Thereafter he became engineer, assistant operating engineer, executive engineer, then operating engineer.

Karl B. Nagler, system development engineer, has been named executive engineer. He has worked up from the ranks, holding various positions including those of assistant superintendent at North Station, and engineer.

John J. Novy has been named to the post of operating engineer. He joined the company in 1924 as a student engineer, later became an outside plant engineer in the engineering department. Most of 1936 he was engaged in special work for the Indiana Natural Gas & Oil Co.

Peoples Gas Light Industrial Gas Motor Rate Approved

GAS for industrial power has been made available to Chicago business concerns through approval by the Illinois Commerce Commission of a "Gas Motor Service Rate" filed by the Peoples Gas Light and Coke Co. The new rate marks the entry of the gas company into the competitive field of industrial power supply.

Gas supplied to industrial customers at this rate will be used in internal combustion gas motors. In some cases the motors will supply power direct, in other cases through the medium of electric generators coupled to the drive shaft.

The first installation of these motors was recently made at the Chicago plant of the Armstrong Paint and Varnish Co. Two 400-h.p. gas motors, driving two 265-kw. electric generators, were expected to be in operation by April 1. Manufactured by the Chicago Pneumatic Tool Co., each combination unit of motor and generator occupies a floor space 7 ft. by 19 ft.

The new rate is designed to encourage the maximum use of gas for industrial power in the off-peak period from April to November. Gas motors being installed are designed to burn fuel oil during the months from November to April, conversion from gas to oil being a simple matter of switching from one supply line to another.

Terms of the new rate are 3c per therm for the first 1500 therms of gas used in any month from May 1 to September 30 with this rate dropping further to 2.25c per therm for all gas in excess of that amount used in any month during this period; 4.25c per therm for gas used in April and October and 12c per therm for gas used in gas motors between November 1 and March 31.

Preliminary studies made by the Armstrong Paint and Varnish Co., upon which their decision to use gas motors was based, indicate that savings in power cost will be sufficient to amortize the cost of gas motors in less than half of their estimated useful life.

■ ■

Northern Natural to Start Work on 20-Mile Line

Construction will start about April 10 on a 20-mile, 20-inch pipe line to provide additional transportation capacity in the Northern Natural Gas Co. system in the territory north of Clifton, Kan.

According to President F. H. Brooks of Northern Natural Gas Co., the line will be a parallel or loop to the existing 24-inch line and will be laid close to it. The starting point of the new line will be at the Clifton compressor station site. Twenty miles north it will tie in with the 24-inch line.

■ ■

Oregon Co. Appoints Nunn

Southern Oregon Gas Corp., Medford, Ore., has appointed G. A. Nunn, formerly of Sacramento, Calif., as manager at Grants Pass. Mr. Nunn succeeds E. C. Westergren, manager there for a year, who has been promoted to accounting department at Medford.

■ ■

Baird Named Manager

George H. Baird, since 1935 general superintendent of the natural gas division of Cities Service Gas Co., Bartlesville, Okla., has been appointed manager, effective March 4. Mr. Baird joined Empire Gas & Fuel Co., Bartlesville, more than twenty years ago. From 1929 to 1935 he was superintendent of operations.

A. G. A. Refrigeration Drive In Full Swing This Month

THE 1937 A. G. A. gas refrigeration campaign will take the form of a giant birthday party, according to Hall M. Henry, 1937 chairman of the association's Refrigeration committee, because gas-operated refrigerators were first marketed by gas companies just a decade ago. The campaign is sponsored jointly by the A. G. A. and the Association of Gas Appliance and Equipment Manufacturers, in collaboration with Servel, Inc.

The main part of the drive will begin this month and continue through May and June. A warm-up campaign was carried on in March, and a clean-up campaign will be conducted in July. Cash prizes totaling $2900 were awarded to 281 gas company sales winners in the March campaign.

Symbol of the campaign will be a 100-pound birthday cake. Twenty-eight cakes will be distributed to winning companies. Nearly a ton of batter will be used in making them and they will be baked in gas ovens. In addition, approximately $40,000 in cash awards will be distributed, mostly to sales persons. Birthday cakes have been exhibited at sales meetings in Pittsburgh, Boston, Chicago, and Memphis.

■ ■

Photostat of "Relief Valve" Article Now Available

The publishers of GAS wish to announce to readers that photostatic copies of the article, "Relief Valves . . . Their Installation and Maintenance," by F. A. Hough of the Southern Counties Gas Co., Los Angeles, Calif., are now available. Mr. Hough's article, which attracted wide-spread attention, appeared in the January issue of GAS, the supply of which has long been exhausted. These photostats are offered as a service to those readers who have written in asking for copies of the article. The photostats may be obtained at a cost of 75c per copy by writing to GAS, 810 South Spring Street, Los Angeles, Calif.

■ ■

El Paso Co. to Build 24-Mile Line to Lordsburg, N. M.

El Paso Natural Gas Co., El Paso, Texas, will construct a 4-inch, 24-mile pipe line to serve Lordsburg, N. M., according to press reports quoting C. C. Cragin, vice-president of the El Paso utility. The line will tie into the company's main line south of Lordsburg.

The extension will provide both the city of Lordsburg and the new power plant under construction by the Community Public Service Corp. The line will be completed, it is planned, by June 1. Cost: about $75,000.

■ ■

P. C. G. A. Figures Reveal 1936 Gains Over 1935

Pacific Coast gas sales in 1936 gained 9.8 per cent over 1935, according to a statistical report prepared by the Pacific Coast Gas Association. The area covered in the report comprises California, Arizona, Nevada, Oregon, Washington, and the province of British Columbia, Canada, and the statistics include all but a few minor operations.

ROPER Gas Ranges

—styled for Today's Modern Kitchen

—priced to Fit Every Need . . .

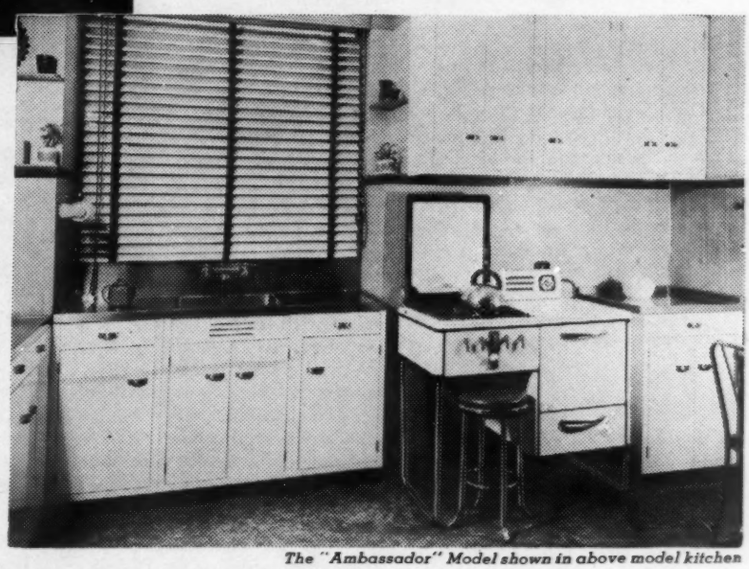
Today the trend is toward Kitchen Modernization. And in that modernization program, the gas range is the Key Unit. Again Roper Gas Ranges set the pace. The new models for 1937 are years ahead —in styling, in features, in performance.

The "Orlando"

"America's Finest Gas Range." That reputation has been earned by 52 years devoted to the manufacture of only quality gas ranges.

The new Roper for 1937 has all these features:

- **Automatic "Insta-Flame" Lighter**
- **Economical Giant High-Speed Burner**
- **"Multi-Flame" Burners with Simmers**
- **"Low Temperature" Oven Burner**
- **One-piece "Air-Stream" Cooking Top**
- **Permanent "Lifetime" Cooking Chart**
- **Roll-Out Broiler with Astogril**



The "Ambassador" Model shown in above model kitchen

ROPER offers you an excellent selection of smart, distinctive gas ranges—models for every type of kitchen—models that will meet the purse of every buyer. There are two new moderately-priced ranges, two new DeLuxe extra-capacity ranges, and many in-between—the most complete group of gas ranges ever offered by Roper.

Gas is cheaper, faster, better

Complete Advertising and Sales Promotion Helps and Service yours for the asking . . . Let us show you

Tie in with the ROPER National Advertising Program

ROPER RANGES ARE IDEAL FOR USE WITH ANY TYPE OF GAS, INCLUDING BOTTLED GAS

GEO. D. ROPER CORP.

GENERAL OFFICES AND PLANT: ROCKFORD, ILL.

WAREHOUSES:

San Francisco, Los Angeles, Dallas, Kansas City, Chicago, Atlanta, Cleveland, Newark, Philadelphia

A. B. DAY

A. B. MACBETH

Merger of L. A. Gas Companies Pending Before Commission

MERGER of Los Angeles Gas & Electric Corp. and Southern California Gas Co., both of Los Angeles, Calif., is pending before the California Railroad Commission, which has on file application for union of the two companies into the Southern California Gas Co. After favorable action by the commission, the proposal would be submitted to the shareholders of each corporation.

Upon completion of the merger, the resulting Southern California Gas Co. would have 650,603 active domestic and commercial gas meters. Total assets would approximate $155,000,000.

More efficient and economical operation and better service are anticipated as a result of the merger. In a joint statement, President Addison B. Day of Los Angeles Gas and Electric Corp. and President A. B. Macbeth of the Southern California Gas Co., said that, in anticipation of the proposed merger, the Railroad Commission had announced that the two utilites had agreed to a reduction in gas rates amounting to $1,000,000 a year to be effective April 1 on all regular meter readings.

■ ■

Mattocks of A.G.A. Laboratory Joins Phillips Petroleum

Elmer O. Mattocks, since 1931 industrial engineer at the A. G. A. Testing Laboratories, on March 15 joined the Phillips Petroleum Co. as industrial engineer.

Mr. Mattocks worked on industrial research problems instituted at the laboratories by the Committee on Industrial Gas Research. His work greatly contributed to findings as reported in seven bulletins on industrial research published by the Laboratories. He is also credited with much of the development of advanced testing apparatus made necessary by these special investigations.

Graduating from Cornell University in 1926 as mechanical engineer, Mr. Mattocks first entered the gas industry with the Syracuse Lighting Co., Inc., as a cadet engineer in the gas production department.

■ ■

P. C. G. A. Offers Awards for Industrial Data Bulletins

CASH and other awards are offered by the Pacific Coast Gas Association's Commercial and Industrial Sales committee for material suitable for Industrial Data Bulletins. R. T. Stephens, Pacific Gas and Electric Co., is chairman of the committee.

To members who submit acceptable data for a bulletin the Association will pay $5 and, in addition, reward the contributor with a loose-leaf binder containing a full set of Data Bulletins published to date. Men who are not members of the Association will receive a membership for the balance of the fiscal year and a binder.

All 1937 Bulletins published and mailed to members prior to August 1 will be eligible for prizes totaling $75.00, selection of the prize winners to be by ballot among the industrial engineers to whom Bulletins are mailed when published. Judging will be according to usefulness, the author of the most useful Bulletin receiving $25.00, second $20.00, third $15.00, fourth $10.00, and fifth $5.00.

C. C. McRae, Pacific Gas and Electric Co., 86 South Third Street, San Jose, Calif., will be in charge of this activity. All material should be sent directly to him.

■ ■

J. A. Woodward, Peoples Gas Light Executive, Retires

JOSEPH A. WOODWARD, since 1933 manager of industrial relations, The Peoples Gas Light and Coke Co., Chicago, Ill., retired from active service on March 1. He had been with the company for nearly 37 years.

J. A. WOODWARD

Mr. Woodward began his career as a fitter's helper. For several years he worked in various departments in many capacities, including those of collector, telephone clerk, adjuster and supervisor of the investigation department, and industrial salesman. In 1919 he entered the employment department, and a year later was made assistant superintendent. In 1924 he became superintendent, and he served in that position until he was appointed manager of industrial relations. In 1929 he was elected president of the Gas Club.

■ ■

Pennsylvania to New York Gas Line Completed

WITH the completion of a 94-mile 14-inch pipe line from the State Line field in Potter County, Pa., to Rochester, N. Y., and a 24-mile 12-inch line from that field to the Sabinsville field in Tioga County, Pa., Cabot Gas Corp., Olean, N. Y., now supplies natural gas to Eastman Kodak Co. at Rochester and to the Pavilion Gas Co., Geneseo, N. Y. The Geneseo utility serves about 5000 customers.

Cabot interests, which have wells in the State Line, Ellisburg, Sabinsville, and Hebron fields, place the total open flow volume at 160,000,000 feet a day.

The pipe line to Rochester uses the highway right-of-way, making 15 railroad, two river, and many highway crossings. The 94-mile line cost approximately $1,500,000. The shorter line cost about $300,000.

Construction of a compressor station in Potter County, Pa., is planned.

A.G.A. Laboratories Group Issues 1936 Report

THE eleventh year of the American Gas Association Testing Laboratories is covered in a generously illustrated, 19-page report issued by the Laboratories Managing Committee. J. S. DeHart, Jr., was chairman of the committee, and those associated with him on it were N. T. Sellman, secretary, A. F. Bridge, R. M. Conner, R. B. Harper, and G. E. Whitwell.

The report states that about 95 per cent of the basic models of the domestic gas appliances sold annually (numbering about 2,500,000) are tested by the Laboratories and found to comply with American Standards.

The report is divided into sections on testing, appliance inspection, research, development and revision of standards, publicity, and the outlook for 1937. In conclusion, the report states that 1936 will undoubtedly go down in the Laboratories' history "as a period during which our establishments definitely emerged from the depression period."

The Laboratory staff numbers 54, and land, buildings, and equipment are valued at about $400,000.

■ ■

Cities Service to Construct 47-Mile Transmission Line

Forty-seven miles of 12-inch pipe line will be constructed by the Cities Service Gas Co., Kansas City, Mo., from the south end of the company's Seminole 16-inch line to the gasoline plant of the Carter Oil Co. near Ada, Okla. Gas will be brought from the Fitts field, through the east side of the gas system, to Kansas City, after passing through Drumright, Tallant, and Grabham compressor stations. Two 10-inch lines will be used in crossing the Canadian River.

Recently the Cities Service Gas Co. contracted with the Carter company for 6,000,000,000 cu. ft. of gas a year.

■ ■

Start Pipe Line Activities for Ottumwa Change-Over

Surveying will start about April 1 for a 3-inch pipe line to bring natural gas to Ottumwa, Iowa, where the Ottumwa Gas Co. expects to start changing over from manufactured gas about May 15.

The pipe line will tap the 24-inch Chicago line of the Natural Gas Pipe Line Co. of America about one and a half miles east of Oskaloosa, Iowa. The line will be tested for 800 lbs. pressure.

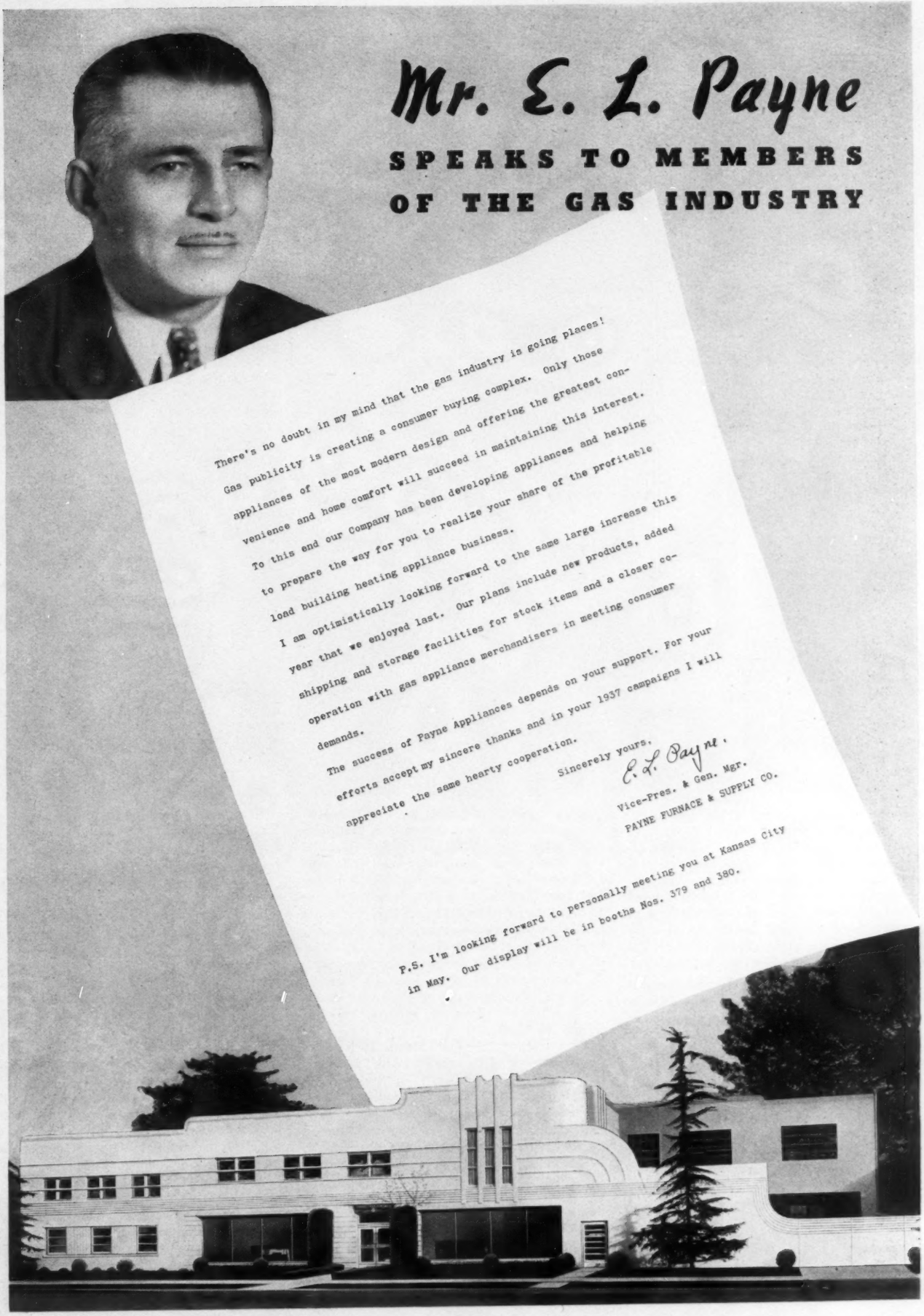
The development will cost the Ottumwa Gas Co. approximately $107,000.

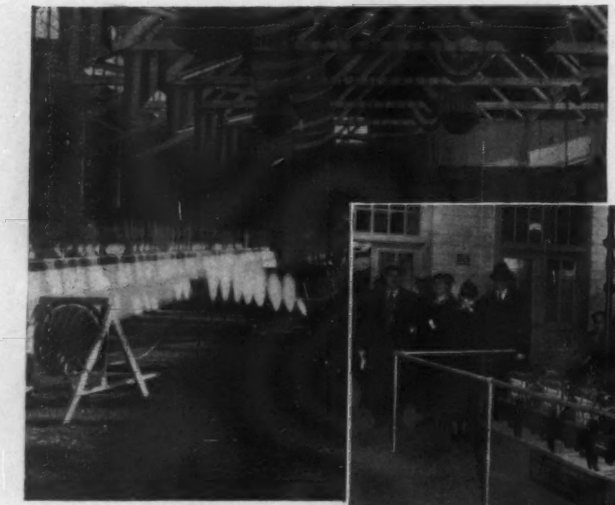
■ ■

1936 Gas Range Sales Top 1935 by 31 Per Cent

A total of 1,500 gas ranges were sold during the year 1936, representing an increase of 31 per cent over the preceding year, according to the statistical department of the Association of Gas Appliance & Equipment Manufacturers.

Sales of gas-fired water heaters of the automatic type increased nearly 20 per cent and gas-fired refrigerator sales were 25 per cent above the 1935 figures.


Mr. E. L. Payne
SPEAKS TO MEMBERS
OF THE GAS INDUSTRY
There's no doubt in my mind that the gas industry is going places!
Gas publicity is creating a consumer buying complex. Only those
appliances of the most modern design and offering the greatest con-
venience and home comfort will succeed in maintaining this interest.
To this end our Company has been developing appliances and helping
to prepare the way for you to realize your share of the profitable
load building heating appliance business.
I am optimistically looking forward to the same large increase this
year that we enjoyed last. Our plans include new products, added
shipping and storage facilities for stock items and a closer co-
operation with gas appliance merchandisers in meeting consumer
demands.
The success of Payne Appliances depends on your support. For your
efforts accept my sincere thanks and in your 1937 campaigns I will
appreciate the same hearty cooperation.
Sincerely yours,
E. L. Payne.
Vice-Pres. & Gen. Mgr.
PAYNE FURNACE & SUPPLY CO.
P.S. I'm looking forward to personally meeting you at Kansas City
in May. Our display will be in booths Nos. 379 and 380.



A battery of 12 radiantfires, installed at the pavilion entrance, attracted universal attention to their welcome warmth.

This arena—332x200 feet—was heated with the gas torch shown above. A fan distributed the warmed air.

Portland Gas Engineers Heat Huge Pavilion With Minimum Expense

By WEBSTER A. JONES

Portland Gas & Coke Company

HEATING a huge livestock pavilion, 930 feet by 120 feet, and its arena, 332 by 200 feet, both with 60-foot ceilings and constructed of wood, was the difficult heating problem solved by gas heating engineers of the Portland Gas & Coke Co., Portland, Ore., recently.

The heating "stickler" was convincingly overcome when the job produced comfortable temperatures for everyone in the building—spectators, salesmen and vaudeville performers—during the eight days of Portland's annual automobile show, despite low temperatures outside. Surprising outcome was the accomplishment of the job within the limited budget allotted. Due to the effectiveness of the arrangement of gas appliances and the low heating rates of the Portland utility, the total cost for fuel was less than $150.00.

The problem developed into three major aspects: First, how to heat the big pavilion in which the cars were displayed to insure the spectators' comfort. Second, how to take the chill out of the huge arena which housed the vaudeville shows. Third, how to heat the stage on which the vaudeville show took place in the cold and airy arena.

How could the temperature be maintained in such large areas with such high ceilings? How could the heat be distributed so that it would reach through the rooms where automobiles were placed? How could the heating job be done with the minimum of expense? How could the job be designed so that the installation costs would not be excessive?

These were the problems which confronted Portland Gas & Coke Co. engineers, A. O. Leech, manager of industrial sales, and C. R. Miller, superintendent of utilization, and their staffs.

They solved the problem of heating the main pavilion by placing 120 Radiantfires in the automotive display room, which had an area of 728 by 120 feet, and by placing two furnaces in the hall and a third furnace to supplement the Radiantfire battery in the main display building.

Most of the Radiantfires were installed 30 inches from the floor on wooden platforms protected by wooden rails three feet from the appliance. These Radiantfires, in groups of four, two facing the center of the building and two facing the walls, were located at 20-foot intervals about 30 feet from the walls and near pillars which supported the roof. By hooking up the Radiantfires in pairs on the platforms, installations were simplified. By placing them 30 inches from the floor the engineers eliminated the possibility of clothing catching in them or persons throwing articles on them.

Two sets of 12 Radiantfires each were placed on low platforms, enclosed by a railing made of pipe, directly in front of the main entrance. This proved a successful arrangement for drawing the attention of visitors to the Radiantfires as they encountered the warm air zone directly upon entering the building. An accurate check showed that six persons out of every ten stopped at these batteries and warmed their hands before continuing through the display floor.

Each of the 120 Radiantfires supplied 20,000 heat units per hour, making a total of 2,400,000 units hourly. They contributed the major part of the 276,440,000 heat units used to heat the exhibition halls and arena during the show. The battery was put into operation each day at noon so that by the time the crowds arrived the place was comfortable.

Despite the high ceiling and the wooden construction, it was possible by this method to bring the temperature from 40 degrees to 65 degrees in three hours. After the temperature of 65 degrees was reached, part of the equipment was shut off and the level maintained. Approximately half of the Radiantfires were in operation near the end of the day's program since no more were needed to maintain the level. This brought savings in heating costs. The appliances were efficient in heating all parts of the halls.

The gas furnaces, displayed by Meier and Frank Co., the Air Flue Furnace Co., and the Kleenair Co., were stock models commonly used for six and seven room houses. Each was fitted with winter air conditioning. The horizon outlet on the top of each furnace was changed so that the air was forced out over the two halls in which they were placed. The three furnaces turned out 100,000 heat units an hour each, easily maintaining temperatures of 65 degrees.

The second big problem, that of heating the arena, 332 feet by 200 feet, with a 65-foot ceiling and a tanbark floor was solved by an "experimental" gas torch, which proved effective. It was impossible to place furnaces in the arena, because it was filled with seats and because of the high ceiling.

This gas torch designed by the engineers was operated for a period before the show, removing the chill and providing enough heat in storage in the fixtures and walls so that when the crowds arrived the temperature was maintained at a comfortable level. The torch was simply constructed and installed and operated without difficulty.

The torch itself consisted of a 2-inch pipe with six pipe nozzle three-quarter-inch jets. Gas was supplied to this torch by a hose. The torch was mounted on a tripod and placed in the center of the arena three hours before the first shows. Behind the torch was placed a 30-inch disk fan which blew the heat from the jets across the entire arena. The torch burned 2,000 cu. ft. of gas an hour. In three hours the temperature was raised from 40 degrees to 65 degrees.

With these two problems solved, the engineers tackled the conundrum of heating the stage in the arena. They designed an efficient arrangement of two Humphrey unit heaters which were placed underneath the stage on each side in such a way that the heated air was forced under the stage and up through the openings and cracks in the floor. This arrangement distributed the heat evenly, keeping the orchestra warm and offering no disturbance for the singers. Temperatures were maintained easily through each performance.

With all the appliances in operation during the week a maximum of three million heat units an hour was reached. This was sufficient to heat 125 five-room homes under the same conditions.

Assisting Messrs. Leech and Miller in the installation and operation of the equipment were Al Finley, Utilization Bureau engineer; John Ryan, Utilization Bureau foreman; C. R. Gibbons, sales engineer, and C. H. Gueffroy, assistant commercial manager. A crew of ten men worked four days to install platforms, Radiantfires, gas torch and other equipment.

Take no chances... use SEAMLESS!

NATIONAL SEAMLESS LINE PIPE

IN the laying of modern pipe lines everything that enters into investment has to be rigidly considered. Initial laying costs, upkeep of the line, and the maintenance of a uniformly good service are vital factors in relation to future profits. Why take chances in the choice of the most important item of the investment — the pipe — when chance can be eliminated? Play safe, install NATIONAL SEAMLESS, the ultimate in pipe reliability.

Pierced from a solid billet of the best quality open hearth steel, NATIONAL SEAMLESS PIPE is without a weld — no long line of possible weakness to fail during installation, or when the going gets rough.

For instance, when crossing ravines and rivers, when going around bends, and whenever pipe is subjected to severe and unusual strains, NATIONAL SEAMLESS offers the greatest reliability obtainable in any pipe today. And there is no chance of leaks developing on account of weaknesses in longitudinal welds, which means full delivery and maximum profits.

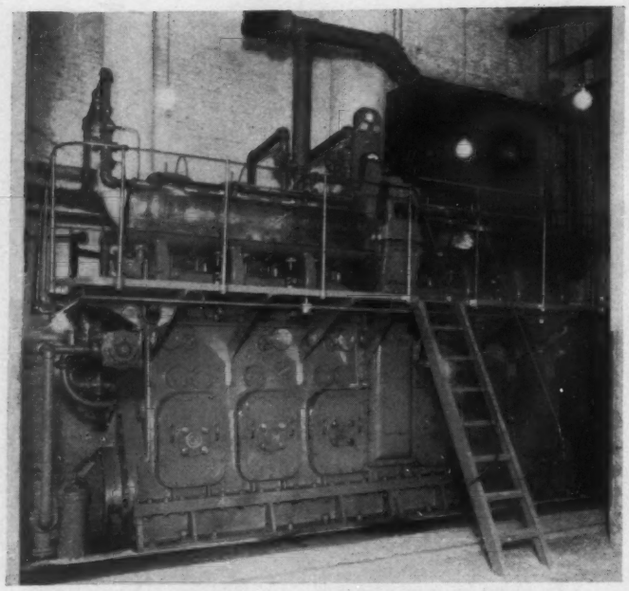
Call on NATIONAL engineers to explain the full advantages of "Walls Without Welds," and how SEAMLESS eliminates uncertainty, promises smooth installation, and long uninterrupted service.

NATIONAL TUBE COMPANY

PITTSBURGH, PA.

United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL



One LR-6 gas engine is used to direct drive a 400 kw. alternator in the basement of Sears, Roebuck & Co.'s store in Dallas, Texas.

Dallas Industries Use Gas Engines To Generate Electric Power

By J. C. ALBRIGHT

Staff Correspondent

LONE STAR Gas Corp., Dallas, Texas, and its affiliated companies, are supplying industrial gas as fuel to over 560 individual customers for electric generation to supplant that formerly purchased from local power companies. Gas engines are used by these consumers of natural gas with the power units attached to and driving the generators by various methods. The number of users operating this type of equipment does not include those who operate exceptionally large power plants, but contains only those who have installed engines up to and including 600 horsepower generating plants. The types of engines operated by this group of consumers vary from the old Model T Ford engine, to Buicks, Packards and Caterpillar engines, reconditioned in most instances, and fitted with gas mixing valves and constant speed governors. Some of the latest installations of power units, such as those installed for Sears, Roebuck & Co., Rialto Theater and others in or near Dallas, were built to use natural gas.

The units installed in the mail order store of Sears, Roebuck & Co. are Cooper-Bessemers, one of which is a 600 hp. engine, and the other a 120 hp. machine. Both are connected to electric generators and air conditioning equipment. Rialto Theater has installed three 8-cylinder, 105-hp. National Transit engines, and one 85 hp., 6-cylinder engine. These engines are fitted to drive two 75 kilowatt generators and two 90-ton Freon air conditioning units.

Kansas City Power To Be Generated by Gas

GAS will supply 40 per cent of the fuel requirements of the Kansas City Power and Light Co., Kansas City, Mo., as a result of a contract signed with the Kansas City Gas Co., which will furnish a minimum of 370,000,000 cu. ft. of gas a month (except from December 23 to February 23) to the power company's two large generating stations. The contract is for five years. Delivery is to begin within 90 days from January 21.

It was necessary for the Kansas City Gas Co. to lay five miles of 24-inch pipe line to serve the two stations. The power company, as soon as the work is completed, will be the largest gas consumer in the city. Beginning May 1 some of its boilers will be put on gas, some will be kept to coal fires exclusively, and some will use a mixture of coal and gas.

During the five-year term of the contract the Kansas City Power and Light Co. will use a minimum of 22 billion cu. ft. of natural gas. Minimum requirements may be used at either of the two plants or at both.

■ ■

Porcelain Enamel Institute Sets Annual Meeting Date

The Porcelain Enamel Institute will hold its seventh annual meeting in Chicago, probably on October 12 and 13, according to announcement by the Institute. Special guests will be members of the Institute of Vitreous Enamelers of England, who are planning a tour of enameling plants in the United States.

The Institute will conduct a nation-wide publicity campaign to mark Porcelain Enamel Week, which has been tentatively set as the week following the Institute's annual meeting.

P.C.G.A. Issues Booklet for General Distribution

A NEW booklet just off the press, planned and designed to promote the increased installation of gas service and equipment in new homes or homes being remodeled, has been issued by the Advertising committee of the Pacific Coast Gas Association. The booklet was prepared under the direction of J. S. Spaulding, advertising manager of the Los Angeles Gas and Electric Corp., in response to an insistent demand of company members for a booklet for general distribution.

The booklet is attractively printed in two colors, stresses the keywords, "All Gas—Modern—Today and Tomorrow," and urges advance planning for gas in homes or income property. Following a discussion of the subject of gas in general as it is applied to household uses, each different application is dealt with in a section devoted to one subject, such as cooking, water heating, space heating and refrigeration.

Space is reserved in the booklet for imprinting the name of the member company purchasing the booklets for distribution. The booklet is so designed that it can be used as a counter piece or for mailing without an envelope.

■ ■

U. S. Supreme Court Nullifies Public Utility Measure

In a 5-4 decision in the case of Great Northern Railway vs. Washington, the United States Supreme Court has nullified as unreasonable the State of Washington statute whereby the state has required public utilities to pay an annual fee of one-tenth of one per cent of gross revenue, the fund thus realized to be used to support the state Public Service Commission.

The federal court found the amount collected was greater than necessary for purely regulatory and inspection expense and that part of the funds were used for other expenses of the Commission.

■ ■

New McDonald Island Field Line Put in Operation

A new 8-inch main from the McDonald Island field was put into operation March 5, 1937 by the Standard Pacific Gas Line, Inc., San Francisco, according to F. F. Doyle, general superintendent. This line, 13 miles long, carries gas from the field to the Stanpac line about 8 miles north of Tracy. Field pressure of the gas is about 2,000 pounds.

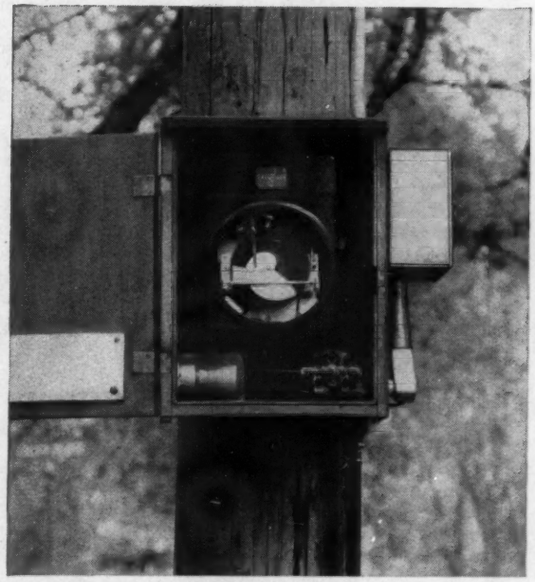
McDonald Island, the new dry gas field discovered last year by the Standard Oil Co. of California, lies 12 miles west of Stockton. The extent of the field is not yet known.

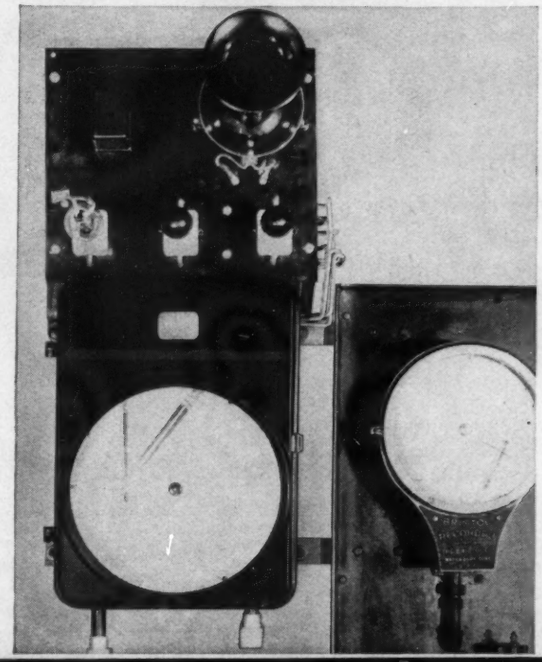
■ ■

Sylvania Corp. Buys 5 Wells

Five leases and five gas wells in Alma, N. Y., have been bought by the Sylvania Corp., Oil City, Pa., according to dispatches. The deal is reported to have involved $500,000. Iroquois Gas Co., Buffalo, N. Y., it is said, will buy the gas. An 11-mile pipe line will be built to tap the wells.

HARNESSING PRESSURES 8 MILES AWAY *lowers pumping costs*





Another Metameter installation offering you a money-saving suggestion

For checking line pressure and holding it within proper limits, one company has installed the Transmitter of a Bristol's Metameter on a street pole, as shown, at a suitable point in the line. The Recording Receiver is located in the pumping station, eight miles away.

As a result there is no guessing about what's going on. Or about when to operate the pumps. The 12 inch Metameter chart instantly reveals every pressure fluctuation at the distant point. It shows whether this is large or small, abrupt or gradual. It provides an invaluable guide to the station attendant in keeping pumping to a minimum, consistent with satisfactory service.

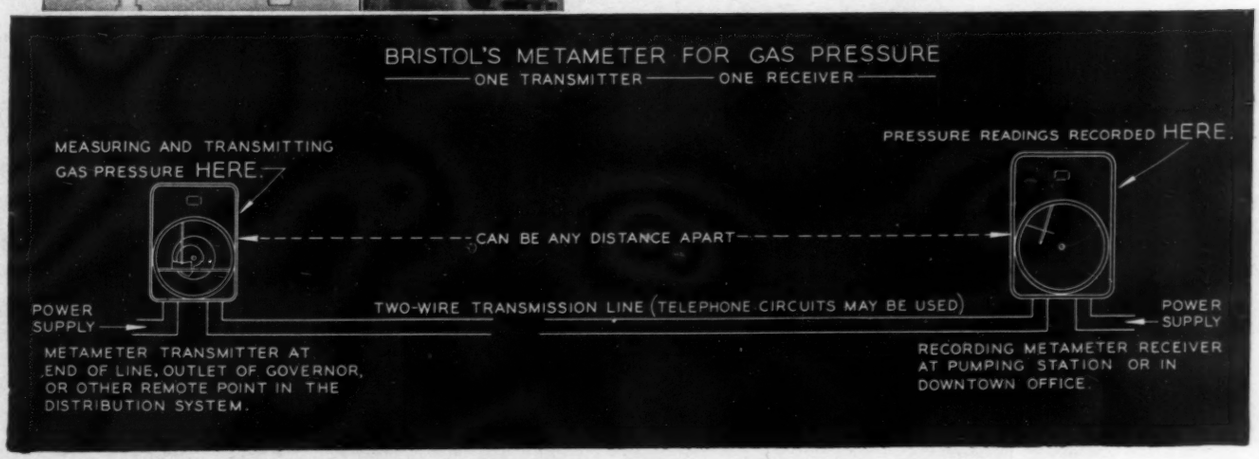
The resulting savings are so surprising that the chances are you, too, will want further information. Write for Bulletin No. 424-N.

THE BRISTOL COMPANY • WATERBURY • CONN.

Branch Offices: *Rialto Building, San Francisco; 747 Warehouse St. Los Angeles; White Building, Seattle.* **West Coast Service Laboratory and Branch Factory:** *311 Minna Street, San Francisco.*

BRISTOL'S

TRADE MARK REG. U.S. PAT. OFF.


BRISTOL'S METAMETER FOR GAS PRESSURE
ONE TRANSMITTER
ONE RECEIVER
MEASURING AND TRANSMITTING GAS PRESSURE HERE.
PRESSURE READINGS RECORDED HERE.
CAN BE ANY DISTANCE APART
POWER SUPPLY
TWO-WIRE TRANSMISSION LINE (TELEPHONE CIRCUITS MAY BE USED)
POWER SUPPLY
METAMETER TRANSMITTER AT END OF LINE, OUTLET OF GOVERNOR, OR OTHER REMOTE POINT IN THE DISTRIBUTION SYSTEM.
RECORDING METAMETER RECEIVER AT PUMPING STATION OR IN DOWNTOWN OFFICE.

Weather-Resistant Porcelain Enamel Signs Widely Used by P. G. & E.

PEPPERING two-thirds of California with assorted signs is a big order, and one which has taken a great deal of thought and experimentation on the part of those Pacific Gas and Electric Co. officials whose job it is to see that company properties are properly equipped with signs.

The order is a big one because the San Francisco company's system covers, within the borders of California, a total area greater than the combined states of New Hampshire, New Jersey, Vermont, Maryland, Massachusetts, Delaware, Connecticut, Rhode Island, and West Virginia. This area is embraced in the central and northern California territory from Humboldt, Trinity, and Shasta counties on the north, to Santa Barbara, Kings, and Kern counties on the south; from the Pacific Ocean on the west to approximately the Nevada State line on the east.

Almost every climatic condition is experienced, including parching desert heat, sub-zero cold in snow clad mountains, moist, salt-laden seaside atmosphere.

Signs to be of use in such varied geographical and climatic situations, must remain fresh, must not deteriorate under the beating summer heat or the blasts of icy mountain winters.

After long years of experimentation the company is steadily increasing its use of porcelain enamel signs for all purposes, which the company has found most serviceable under trying conditions.

The company has standardized upon vertical type signs in porcelain enamel for all its offices. These signs announcing P. G. and E. service are in venetian red and buff, some with neon, or the lumenarc development of neon. Signs for the larger offices are 17 feet long. For the smaller offices the same signs are made in 12-foot and 9-foot lengths.

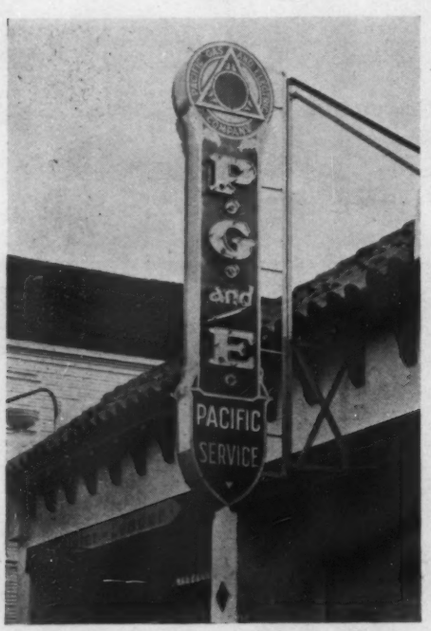
These office signs are only one type of sign used by the company. More than 30 different types are in use throughout the territory.

On transmission towers porcelain enamel warning signs read: "Danger: Keep off. These towers carry high voltage electric wires. It is dangerous to climb them."

Release of water from the power houses constitutes a serious hazard to fishermen in the stream below. Large warning signs have been posted at all such danger points reading: "Warning. Water may be discharged from the power house in this area at any instant. It is extremely dangerous. Keep away." These signs have to stand severe wear and tear and widely fluctuating temperatures.

Other enamel signs range from emblems on the company's two thousand automobiles and trucks, to tramway "Warning" and "Hoist" signs, and scores of others.

Standardization on porcelain enamel signs has been increasing for some 15 years since the company found that this type of sign was superior in withstanding the ravages of severe climatic conditions and vandalism, as well as in resisting other damaging forces.



Standard vertical porcelain enamel sign used throughout the Pacific Gas and Electric company territory.

■ ■

1937 Building Estimate Hints At Large Appliance Market

APPROXIMATELY 425,000 new homes will be built in the United States during 1937, according to a prediction of William C. Bober, head of the Johns-Manville statistical research department. Mr. Bober's forecast appears in a recent statistical issue of *American Builder*.

Of vast interest to the gas industry because of the field for gas appliances that the new construction will open, the estimate is an increase of 60 to 65 per cent over his computation of 1936 building.. Mr. Bober's prediction takes into account building activity in small towns and rural areas, construction generally overlooked or underestimated.

New homes built will greatly exceed his advance estimate of 425,000, the author states, if fear of inflation should become a more pronounced factor than at present, in which event cash would "seek refuge in real estate."

■ ■

Position of Big Business Analyzed in New Book

Big Business: Its Growth and Its Place (Twentieth Century Fund. Price: $1.35) is the first of three volumes embodying the results of a study of big corporations and their place in American life which was begun in August, 1934, by a special research staff under the direction of Rufus S. Tucker. Alfred L. Bernheim prepared the findings of the research report for publication. Two succeeding volumes will be entitled *How Profitable Is Big Business?* and *Big Business Salaries.*

This first volume attempts to show how large big business bulks in comparison with the smaller concerns on the American economic map as a whole, and on the various sectors of the map which represent specific industries and groups of industries. It shows, for example, that individuals and partnerships still carry on almost half of the country's total business. Only 57 per cent of economic activity is incorporated at all and the proportion that corporations do of total business varies greatly from one industry to another.

The reports as edited and presented in *Big Business: Its Growth and Its Place* are purely factual studies, as will be the two succeeding volumes. After their publication, a special committee, headed by Ralph E. Flanders, will formulate a program of action to meet whatever problems the research reveals.

■ ■

Fogg and Tapscott Elevated In Consolidated Edison Co.

AT the organization meeting of Consolidated Edison Co. of New York, Inc., held March 17, Oscar H. Fogg, formerly executive vice-president, was elected to the newly created position of vice-chairman of the board and Ralph H. Tapscott, formerly vice-president of Consolidated Edison in charge of electrical operations within New York City, was elected president and a trustee. Mr. Tapscott succeeds Frank W. Smith who, at his own request, was not re-elected to that office in view of his impending retirement at the end of June under the company's age limit of seventy.

O. H. FOGG

■ ■

Northwestern Natural Seeks Increase of Gas Supply

So great has been the increase in demand for its gas during the present winter that the Northwestern Natural Gas Corp., Seattle, Wash., is planning to increase its available supply and also to increase the pump capacity of its lines. Gas supplied by the company in December, 1936, was nearly double the amount served in December, 1935.

A deep test well is now being drilled in the Rattlesnake Hills area, and this is expected to add substantially to the supply. The company may start a series of tests in an effort to extend the present proved field.

■ ■

Writer for GAS Conducts Rate Course at Northwestern

A COURSE on public utility rate structures is being conducted at Northwestern University by W. J. Crowley, a contributor to previous issues of *GAS*. The course takes up the technical problems involved in public utility rates and in the theories of regulated monopoly pricing.

QUALITY—SERVICE
AND
COMPLETE STOCKS

• • •

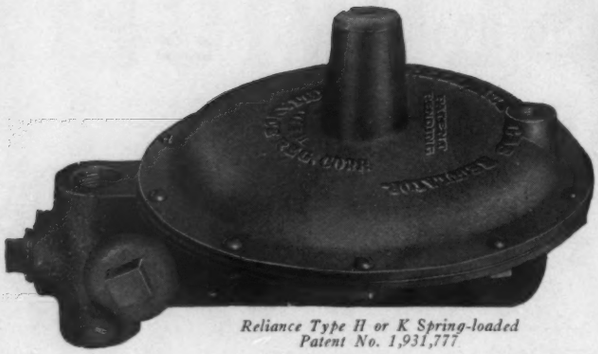
the logical source of supply

REPUBLIC PATENTED LINE PIPE
WALWORTH VALVES and FITTINGS
ANACONDA COPPER TUBING
WORTH QUALITY STEEL PLATE
DAYTON COUPLINGS
U. S. S. STAINLESS STEEL
REPUBLIC TONCAN IRON

WESTINGHOUSE FLEX-ARC WELDERS
WALCO PIPE WRENCHES
YALE & TOWNE HOISTS
NORTON GRINDING WHEELS
VALDURA CASEIN PAINT
MORSE DRILLS & TAPS
TOLEDO PIPE TOOLS

DUCOMMUN METALS & SUPPLY CO.

Los Angeles San Francisco



Reliance Type H or K Spring-loaded
Patent No. 1,931,777

Reliance Type H or K Dead-weight

Positive Control of Service Pressures

Reliance Type "H" and "K" Regulators have all these desirable features: sensitive pressure regulation; positive lock-up when consumption stops; minimum pressure loss in the Regulator; large flow capacity; rugged construction and long life.

Specially designed toggle action gives a longer and more powerful thrust on valve seat and results in lower lock-up pressures. Valve seats can be removed or changed in size without disassembling the Regulator. Diaphragms can be furnished in leather or composition. Made in 8 sizes, from ¾" to 2"; spring or weight loaded; fully described in Bulletin No. 38.

Reliance Regulators are made in complete lines for domestic, district and industrial purposes, for natural, manufactured, butane, propane and liquid petroleum gases.

Embodying refined engineering principles and the latest features in design, these Regulators have fully demonstrated that they have a better performance record, larger capacity and lower lock-up pressures than any other regulator of the same size and type. They are made with or without mercury seal attached and can be supplied with internal mechanical relief where desired. Valve seats can be renewed or changed as to size simply by removing end plug and inserting a hexagon wrench into the recess in the valve seat body. The valves are very accessible. A plug is provided in the side of the Regulator for quick inspection; and if necessary, the valve seat disc can be removed and the valve seat cleaned, returning the Regulator to service in minimum time.

A standard pipe plug on the high pressure side of the Regulator permits the attachment of a gauge for taking service pressures, and service lines can be blown free of dirt, scale, etc., through this opening. In distribution systems where dust troubles exist, the type "H" Regulator is extremely economical. Valves can be changed and dust blown out in a short time; it is seldom necessary to remove the Regulator from the line and take it to the shop for repairs. Where the side inlet is used for service connection, the bottom connection, when plugged, acts as an accumulation reservoir for dust and dirt. All Reliance Regulators are made from special alloyed castings with unexcelled qualities.

Reliance Regulator Corp.

Send for Bulletin

1000 MERIDIAN AVENUE ALHAMBRA, CALIFORNIA

RELIANCE REGULATORS

MEASUREMENT and CONTROL

Positive Gas Meter Is Topic At March S.C.M.A. Meeting

FEATURING a discussion on the "Evolution of the Positive Gas Meter" by Frank S. Honberger, meter shop foreman, Southern California Gas Co., the regular March meeting of the Southern California Meter Association proved of unusual interest to the 60 attending members. The meeting was held at the Van Matre Inn, Huntington Park. Guy Corfield, president of the Association, presided.

Sidelights on metering problems in two widely divergent parts of the country were presented by John Wiley of the Key Co. and V. C. Jarboe, former superintendent of the meter department of the Cities Service Gas Co., Bartlesville, Okla. Mr. Wiley from his many years' association with the oil industry in California gave an insight into early metering conditions in California. Mr. Jarboe's topic was "Metering in the Middle West."

Entertainment during the evening was provided through the courtesy of the Sprague Meter Co., E. H. Roseberry, Los Angeles branch manager, acting as master of ceremonies.

In February the Association held its tenth annual Hi-Jinks, which was attended by more than 300 members and friends. James Dunn, chairman of the Entertainment committee, and members of the board of directors were extended an ovation at the March meeting for their work in planning and carrying through the Hi-Jinks.

■ ■

American Meter Announces Gas-Tight Index Meter Box

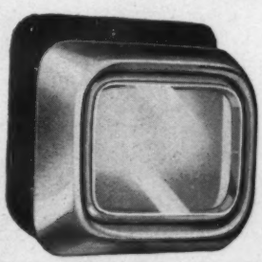
American Meter Co. has introduced a permanently gas-tight index box mounting for its Tinned Steelcase Meter. The mounting is called the American Soldered Seal Index Frame and Glass.

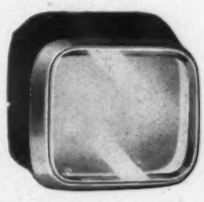
The index window is a new application of Pyrex Brand glass. It is heat resistant and will mitigate breakage due to the character and strength of the glass and the design of the index box frame. This product, made exclusively for American Meter Company, has a metallized (copper) edge by which the glass can be soldered directly to the tinned steel index frame, thus effecting, the company states, a metallic bond and gas-tight seal.

Twenty-five pounds is the test pressure.

The company states that since index frame leaks are practically eliminated, the stuffing boxes can be packed lighter, thereby reducing stuffing box friction and variations from accuracy, attributable to this cause.

The new feature is made available for American Tinned Steelcase Meters in sizes 5-B and 60-B inclusive, 5-M and 10-A to 30-A inclusive.





Gas-tight index box mounting introduced by American Meter Company.

The Joliet Reference Gas Meter

THE following abstract of Bureau of Standards Paper RP 908 by Howard S. Bean, M. E. Benesh, and Frank C. Whiting was furnished by Mr. C. B. Heartwell, gas engineer, Standard Gasoline Co., Whittier, Calif., as a part of his address on the Joliet Reference Meter, presented before the Southern California Meter Association, January 28, 1937. Copies of the paper may be obtained from the Bureau of Standards.

ABSTRACT

Upon invitation, the National Bureau of Standards cooperated with the Peoples Gas Light and Coke Co., Chicago, Ill., in the design, construction, and testing of a reference gas meter capable of being used over a wide range of conditions and having a high maximum capacity. The meter is of the proportional type in which the main gas stream is divided into a large and a small stream in a known or determinable ratio. The rates of flow in the two streams may be varied and the actual ratio of the mass rates of flow is determined by a thermal method. Two heat exchangers, one in each gas stream, receive heat through the medium of hot water from a common source. The rates of flow of the hot water to the two heat exchangers are adjusted until the temperatures of the outlet water streams are the same. The outlet water streams are discharged into weighing tanks from which the ratio between their rates of flow is obtained.

The rates of flow of the gas in the two streams are then adjusted to bring together their temperatures on the outlet side of the heat exchangers. Hence if the two gas streams are warmed through one temperature range, while the two water streams are cooled through another temperature range, the ratio of the mass rates of flow of the gas streams will be equal to the ratio of the mass rates of flow of the water streams.

The rate of flow in the small gas stream is measured with a large piston meter. The pressure and temperature of the gas in the piston meter are carefully measured, and the specific gravity of the gas, referred to air, is determined. With these data, and the displacement of the piston for the duration of the test, the density and total mass of gas that passed through the small passage are computed. Dividing this total mass flow by the duration of the test gives the mass rate of flow through the small branch.

The total mass rate of flow into the reference meter may now be computed by the formula

$$w = w_s (C_m + 1)$$

in which

w (lb/sec) = total mass rate of flow into reference meter.

w_s (lb/sec) = mass rate of flow through the small stream.

C_m = ratio of mass rate of flow in the large stream to that in the small stream.

= ratio of mass rates of flow of water into the two heat exchangers.

The operation of the piston meter is described, and the procedure of making a test with the reference meter is outlined.

The results of 15 tests of an orifice meter with the reference meter are presented and discussed. It is shown that excepting for the determination of the specific gravity of the gas, which is done with auxiliary equipment apart from the meter, the probable uncertainty in any item or factor will not affect the indicated rate of flow by more than about $\pm$ 0.05 per cent.

Central Kentucky Permitted Lexington Extension

THE Central Kentucky Natural Gas Co., of Lexington, Ky., has received permission from the court to extend gas lines along twelve streets and intersecting streets and alleys in the suburbs south of the city of Lexington.

The Central Kentucky Natural Gas Co. has gradually been taking over service in the city's suburbs. Previously these were served by the Louisville Gas & Electric Co. whose mains pass through Lexington enroute from the gas fields to Louisville.

■ ■

Minn. Co. Adds to Plant

Worthington Gas Co., Worthington, Minn., is building an addition to its main plant to house a new gas manufacturing machine. This will be used to supplement the present service.

BUTANE-PROPANE NEWS

BUTANE . . . Its Use As a Substitute and Standby Gas

By P. C. DeHAAN

Des Moines Gas Company*

THE advent of natural gas into this section of the country has brought about the necessity of a substitute, both wholly and partially. One hundred per cent substitution in localities where straight natural gas is served, and partial substitution and augmentation where the service is a mixed gas.

This substitute gas, in any case, must be such that it will give fairly satisfactory performance on all gas appliances, and its final cost must be lower than any other substitute available.

In communities where straight natural gas is served, and conditions call for the installation of equipment to guarantee a supply, and possibly to level off the peak loads, there are several means of accomplishing this end.

1. Installation of high pressure storage.
2. Installation of a high B.t.u. manufacturing plant.
3. Construction of a butane-propane-air plant.

The choice of any of these processes will be dependent upon the initial installation cost, the final cost of the gas as delivered, and the service rendered.

By the use of high pressure storage, only a few days' supply are available in case of natural gas shortage and for augmenting peak loads. While the cost may be low, the safety factor is also low.

Numerous tests have been made, using high B.t.u. oil gas as a substitute for natural gas, results of which have been fairly satisfactory. Tests have also been made, using butane-propane-air, which have been proved successful. Having the satisfaction that both oil gas and butane-propane-air will substitute for natural gas, the cost of installation and operation is very much in favor of the butane-propane-air equipment.

Such equipment can also be used to keep the demand down on peak load days, and thereby maintain a lower overall cost. Especially is this true when the ratio between peak and low loads is large.

In communities where a mixed gas is served, the usual practice is to serve approximately an 800 B.t.u. gas. Several such plants are already in operation, making a percentage of the gas.

Points to be taken in consideration in selection of equipment to maintain service, and keep the final cost of gas at a minimum include the following:

1. Capacity of the present plant.
2. Cost of installation of new equipment.
3. Use of new equipment in maintaining and controlling demand.
4. Availability of gas in case of natural gas shortage.
5. Substitutes must give fairly satisfactory service.

In case of natural gas shortage, the capacity of the present plant must be able not only to meet the average daily demand, but the maximum daily demand. This peak demand occurs only for a few days during the year, especially so if there is appreciable house heating. Idle generating equipment, for possibly 98 per cent of the time, is expensive, causing the cost of peak gas to be very high. Costs of the raw materials such as coal, coke, gas oil, fuel oil, etc., also have their bearing upon the final or holder cost of the gas.

If the present plant capacity is too small, means must be provided to take care of the increase necessary. A great field for reducing operating costs lies in keeping capital expenditures for additional generating equipment at a minimum. It is frequently advisable to buy the least expensive type, even though production costs may be higher than the more expensive equipment. This new equipment must furnish a gas that will enable us to use it as a means of controlling our demand, and under conditions of natural gas shortage, will generate a sufficient

*Presented at the Mid-West Gas School and Conference, Iowa State College, Ames, Iowa, November, 1936.

TABLE NO. 1. CITY GAS ANALYSIS—780 B.T.U.

Constituents	Summer Load	Light Winter Load	Average Winter Load	Peak Winter Load	No Natural Gas	
					Butane Vapor	Butane-Air 1320 B.t.u.
CO_2	2.5	2.0	2.3	2.7	4.0	3.1
Ill.			2.1	4.4	6.8	7.2
O_2	.5	.3	.3	.3	.2	3.3
CO	9.5	12.4	15.3	18.0	27.6	21.5
H_2	12.0	16.6	20.5	24.6	37.7	29.5
CH_4	54.0	50.8	44.0	35.1	10.0	10.5
C_2H_6	9.1	9.4	8.3	5.7	.3	.3
C_4H_{10}			.6	2.5	10.0	10.3
N_2	12.4	8.5	6.6	6.7	3.4	14.3
Calc. Gravity	.659	.629	.635	.665	.742	.819
Calc. B.t.u.	778	777	777	774	783	768
B.t.u. gas on Sets	230-240	285-290	440	530	510	600
B.t.u. with Butane			480	640	780	780
Percent, Blue	30.0	32.5	39.3	47.5	72.5	56.5
Percent, Oil	0.0	0.0	5.1	11.0	17.5	18.5
Percent, Butane	0.0	0.0	.6	2.5	10.0	25.0
Percent, Natural	70.0	67.5	55.0	39.0	0.0	0.0
Gal. Oil/M Set			1.85	2.92	2.82	3.90
Gal. Oil/M Total			.80	1.70	2.52	2.85
Gal. Butane/M Total			.20	.78	3.12	3.22

amount of gas to meet the maximum daily sendout. This substituted gas must be such that, when mixed with other gases available, whether for demand control or gas shortage, the final gas will have such characteristics as to give fairly good service.

We, in Des Moines, have installed a butane storage and vaporizing plant with a capacity of 45,000 gallons, at a cost of approximately $10,000.

The installation of a butane plant must meet the requirements of the National Board of Fire Underwriters, on the Regulations for Liquefied Petroleum Gases.

The cost of butane in storage is around five cents per therm, which is not out of line when considered as a substitute or standby-gas. If the installation of the plant is up to standard, there is very little loss in stock. There is practically no deterioration to the plant, outside of weathering, which would require paint from time to time. The cost of such storage, as compared to water gas machines, is very small. However, it must be remembered that there are certain limits to all types of substitution.

In the operation of our plant, gas from the sets is purified, mixed with butane and natural gas on the inlet of the station meter, then passes to the storage holders. The mixing control, controlling the natural gas, maintains 780 B.t.u.'s regardless of the quantity of butane used, provided the B.t.u., after the butane is added, is below 780. Table No. 1 shows an analysis of city gas.

The amount of butane used, with a given demand, is made to vary according to the amount of gas the sets are to make. As the quantity of gas made by the sets is increased, the calorific value also rises. This is due to the fact that oil is used to replace natural gas.

We have found in our situation that the use of the ratio of 0.5 to 0.6 gallons of butane to one gallon of oil would give us a final gas of such characteristics as would give good service. For numerous reasons this ratio had varied, so that observations have been made on different ratios. We found that the ratio, when dropped to less than .2 gallons of butane to one gallon of oil, we acquired a gas that would pop back on furnace burners. The upper limit we have never reached, and we have been as high as 1.2 gallons of butane to one gallon of oil.

During the winter of 1935-'36, we operated a water gas plant and mixed carbon water gas, butane and natural gas for a final gas of 780 B.t.u. The maximum on our demand of natural gas was 3138 M cf. per day, as shown in Fig. 1.

Butane is a very desirable substitute for controlling demand in our case, since our peak to low load ratio is approximately 4 to 1. This high ratio necessitates a demand lower than that required of a 3 to 1 ratio. With this lower demand, both the quantity and B.t.u. of the gas to be manufactured are greater. To maintain this demand at peak loads requires a manufactured gas of 640 B.t.u., which, if it is all carbureted water gas, will result in an unsatisfactory mixture. With the use of butane, this is reduced to 530 B.t.u., resulting in better oil efficiency, and a gas which burns satisfactorily.

Variations in gravity, due to different percentages of the various gases mixed, were found to be at a minimum. During the summer months we mix 30 per cent blue producer gas with 70 per cent natural gas, with a resulting gravity of .67. On light winter loads, the mixture is composed of 32.5 per cent blue gas and 67.5 per cent natural gas, with a gravity of .63. On our peak day last winter we made the following mixture: 47.5 per cent blue gas, 11.0 per cent oil gas, 2.5 per cent butane vapor and 39.0 per cent natural gas, with a final gravity of .69. All of these mixtures were found to give satisfactory service.

In case of natural gas shortage, both oil and butane would be considerably increased, and such proportions used as would result in satisfactory service. We have had no experience in this respect, but by the use of butane we can meet our present loads.

In conclusion, we might sum up a few of the observations made, in the limited experience we have had using butane last winter.

1. It materially increases the capacity of the existing equipment, at an expenditure far below what any other equipment would cost.
2. The labor requirements for its operation are at a minimum.
3. The equipment is able to start up and reach maximum production in a few minutes.
4. Butane, mixed with other gases, does not require an exact mixture; the limits are rather wide.
5. Several mixtures of gases can be obtained to maintain satisfactory service by which natural gas demands are controlled.
6. The cost of butane gas, compared with other gases available, is not excessive, being very reasonable when considered as a standby gas.

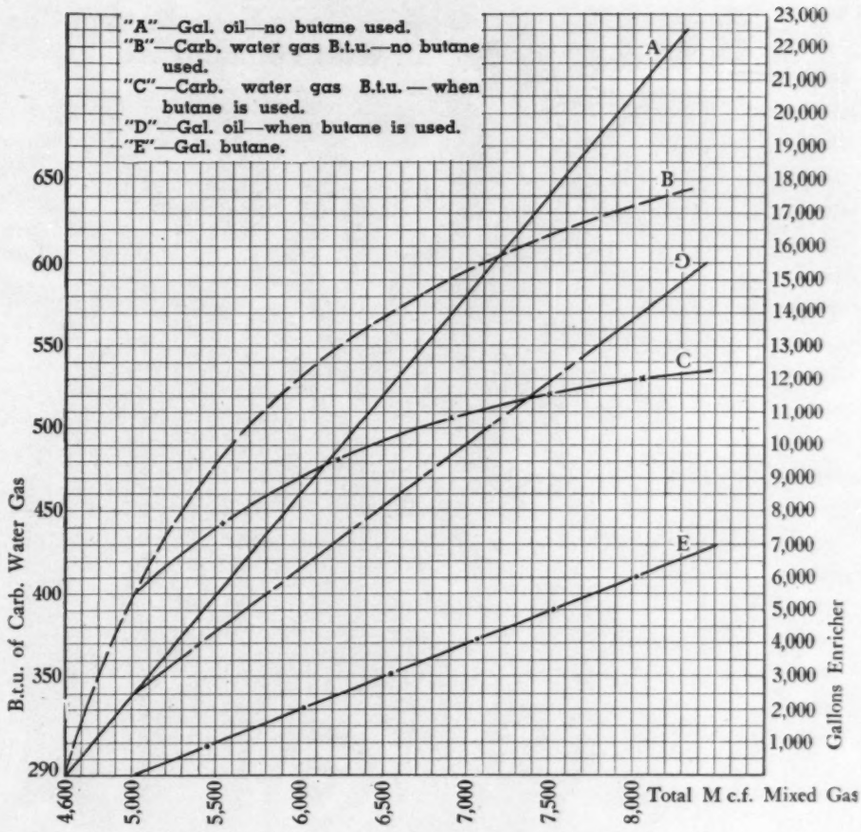


FIG. 1. Relationship of enricher and B.t.u. on 780 B.t.u. mixed gase. Natural gas demand rate—3138 M c.f.

N. B. G. A. Midwest Section Meets in Cedar Rapids

The first meeting of the Midwest Section of the National Bottled Gas Association, recently granted a charter by the national association, was held in Cedar Rapids, Iowa, on April 2.

Safe practices at plants, filling station, and warehouses were discussed in a paper by W. Watkins. G. L. Brennan took up the topic of safe practices in making installations and delivering gas to customers.

Other papers included, "Use of Propane for Industrial or Semi-Industrial Purposes," by H. S. Bunn; "Value of Merchandising High Grade Appliances" by O. A. Kohl, and "Selling Against Aggressive Electrical Competition," by F. B. Boice. C. A. Wolfe gave the report of the committee on Proposed Co-operative Advertising.

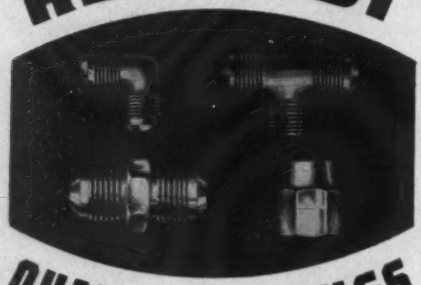
B. D. Geroy is chairman of the Midwest Section.

■ ■

Build Canada Extraction Plant

The Burrell-Mase Engineering Co., Pittsburgh Pa., recently completed a lime extraction plant for removing hydrogen sulfide from natural gas for the Oxford Pipe Line Co. The plant is near Tillsonburg, Ontario, Canada. It handles 5,000,000 feet of gas daily.

KEROTEST



QUALITY FITTINGS

for every propane gas installation

Kerotest Fittings of heavy design are the work of master craftsmen and comprise a complete line of S.A.E. flare crosses, tees, elbows, unions, and nuts for your copper tube installations of propane gas.

Each one is individually inspected to insure smooth, finished seats and clean-cut threads — then individually protected by cardboard ferrules and carefully packed in strong, iron bound boxes,—your assurance of receiving them in factory-perfect condition.

KEROTEST MANUFACTURING COMPANY
PITTSBURGH, PA.

Wak Co. to Serve Natural Gas in West Virginia Area

PERMISSION has been granted by the Public Service Commission to Wak Co. to construct facilities in West Virginia for furnishing natural gas to consumers at Wickham, West Raleigh, Raleigh, Beaver, Glen Hedrick, Daniels, Blue Jay and adjacent territory in Raleigh County, and at Brooklin, Avis, and Hinton, in Summers County.

According to a statement of the commission, natural gas is not now served in those communities.

The commission has under advisement application of Wak Co. for permission to serve natural gas in the city of Eccles, in Raleigh County.

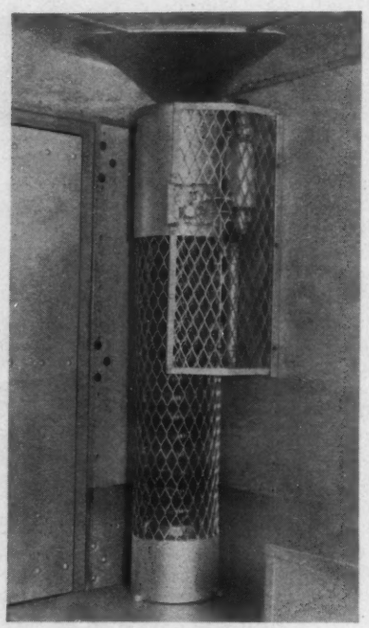
■ ■

A. E. Schenuel Affiliated With Gardner Advertising

A. E. Schanuel, formerly vice-president of Hart Vance Co., has joined the Gardner Advertising Company.

During the past seven years, Mr. Schanuel has directed promotion campaigns for the Union Electric Light & Power Co., the St. Louis County Gas Co., and the Mississippi River Fuel Co. of St. Louis; The Peoples Gas & Coke of Chicago and Rex Cole, Inc. of New York City.

In connection with the Gardner Experimental Kitchens in St. Louis, Schanuel's new activities will cover market development work in the home appliance and home modernizing fields.



Truck Refrigerating Unit Undergoes Improvement

A NUMBER of changes have been introduced in the McCord Radiator & Mfg. Co.'s truck refrigeration system, described in the August, 1934 issue of *Butane-Propane News*. In 1935 the company designed a "tubular convector" which combines refrigeration circuits, heat exchangers, expansion valves, and air circulation system in a single unit. The addition of a dehydrating element is now announced, to remove any moisture that may be present in the propane fuel, thus eliminating any chance of stoppage due to freezing at the expansion valve. The ingoing fuel refrigerant passes through the dehydrating element before entering the expansion cycle.

As shown in the illustration above, the "tubular convector" is located in an upright position at one corner of the truck body. After the propane has been expanded to a dry gas, doing its work of refrigeration in the process, it is led outside the refrigerating compartment through two pressure regulating valves, to the carburetor.

Temperature distribution is obtained by the circulation of chilled air within the refrigerator body by means of the motor-driven fan located within the cooling cylinder. The fan unit is the only moving part.

■ ■

R. L. Manier Advanced by Niagara Hudson Power Co.

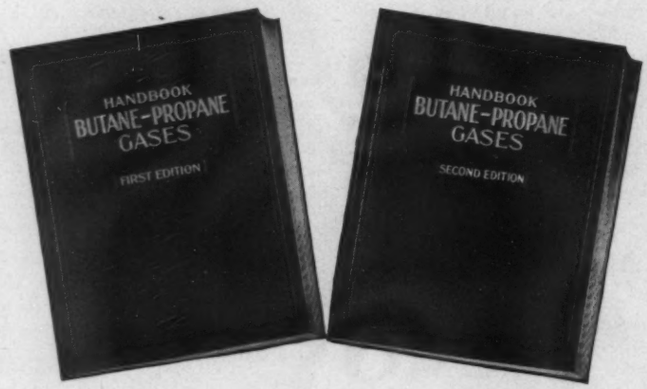
Ralph L. Manier, industrial heat engineer for the Syracuse Lighting Co., Inc., Syracuse, N. Y., has been appointed to the Central Division Staff of the Niagara Hudson Power Co. for coordinating all promotional activities in commercial and industrial heating and air conditioning sales. Mr. Manier is a graduate of Rensselear Polytechnic Institute and has been in charge of the above mentioned activities for the Syracuse Lighting Co., Inc., since 1920. S. W. French of the Syracuse Lighting Co., Inc., succeeds Mr. Manier.

NOW READY—published March, 1937

The SUPPLEMENT to the Handbook Butane-Propane Gases 2nd edition . . . $1.00 Per Copy

A record of the past two years of progress in the *Liquefied Petroleum Gas Industry*

This publication together with the 1st and 2nd Editions of the Handbook constitutes a complete library on the subject of Liquefied Petroleum Gases



1st Edition Handbook . . . $5.00
2nd Edition Handbook . . . $5.00
2nd Edition Supplement . . $1.00

ALL THREE NOW $7.50 plus postage

We pay the postage on orders accompanied by remittance.

Published by publishers of OIL & GAS Equipment Review

GAS *The Natural Gas Magazine*

810 S. Spring St.
Los Angeles, Calif.

A. E. Schwarz Joins Bryant Heater Sales Staff

A. E. SCHWARZ, formerly sales sponsor, Ebasco Services, Inc., New York City, recently joined the sales department of Bryant Heater Co., Cleveland, Ohio. Mr. Schwarz has been with Electric Bond & Share Co. since 1930, specializing in the development of sales in the E. B. & S. gas properties.

A. E. SCHWARZ

Immediately prior to that time he was sales and advertising manager for the Minnesota Northern Power Co., Minneapolis, Minn. For eight years he was associated with Westinghouse Electric and Manufacturing Co., in the company's offices in Richmond, Va., Baltimore, Md., Philadelphia, Pa., Chicago, Ill., and Minneapolis.

Mr. Schwarz has been active in programs of the American Gas Association, Commercial Section. In 1934 he was vice-chairman of the Mid-West Regional Gas Sales Conference.

■ ■

Memphis Meeting Hits New High for Southern Gas Men

(Continued from Page 16)

Atlanta Gas Light Co. and E. J. McGuirk Jr., New Orleans Public Service; "Actual Operation and Maintenance Expenses Utilizing Fuels Competitive with Gas," J. B. Milmoe, Southern Natural Gas Co.

President H. E. Meade presided over the general session programs and W. E. Leverette, chairman of the Sales Conference committee, presided over the Sales Conference programs except for one session presided over by L. L. Baxter, Arkansas Western Gas Co., Fayetteville, Ark., incoming chairman of the Sales Conference committee.

New officers elected were Chester L. May, Community Natural Gas Co., Dallas, president; H. G. Bonner, Nashville Gas & Heating Co., first vice-president; W. H. McGinnis, Memphis Power & Light Co., second vice-president; Streuby Drumm, New Orleans Public Service, Inc., re-elected secretary and treasurer. New directors elected were Ed. C. Kollock, Atlanta Gas Light Co.; A. D. McLean, Pittsburgh Equitable Meter Co.; L. B. Denning, Jr., Community Natural Gas Co., Dallas; Harry K. Wrench, Jacksonville Gas Light Co., Jacksonville, Fla.

Memphis' hospitality and well planned entertainment entered strongly into making the convention an outstanding success. Paul Renshaw, Memphis Power & Light Co., served as chairman of the entertainment committee. Features of the program were a dinner and theater party for the visiting women and the local women's entertainment committee; a "Klondike" smoker for the men; a bridge luncheon for the women, and a dinner dance.

The roll will be called next year at Dallas.

FINE WORKMANSHIP IN EVERY DETAIL

VALVE PROTECTION

Protection for the valve at the top of this Hackney cylinder is provided by a welded-on collar. The valve is perfectly accessible, yet protected against ordinary damage caused by rough treatment in stacking, rolling or up-ending.
Selection of proper raw materials, and over 30 years' experience in the design and fabrication of Hackney containers provide dependable service and greater economy for the user.
Write for complete information about Hackney cylinders for Butane, Propane and Butane-Propane mixtures.

Hackney MILWAUKEE

PRESSED STEEL TANK COMPANY

208 S. LaSalle St. Room 1185, Chicago
1363 Vanderbilt Concourse Bldg. New York
6633 Greenfield Ave. Milwaukee, Wis.
666 Roosevelt Bldg. Los Angeles, Calif.

Containers for Gases, Liquids and Solids

Butane

ENGINEERING • FUEL SUPPLY • EQUIPMENT

Automotive Conversions • Gas Plants • Bulk Storage Stations

AMERICAN LIQUID GAS CORPORATION
650 South Grand Avenue • Los Angeles, California

COOPERATIVE LOAD BUILDING

P. C. G. A.

BULLETINS

COMMITTEE
A. C. JOY, (P. G. & E.) Chairman
FORREST RAYMOND (San Diego Cons. G. & E. Co.)

COMMITTEE
J. S. SPAULDING (L. A. G. & E.)
CLIFFORD JOHNSTONE Managing Director Pacific Coast Gas Association

Roll Call

Partial List of

PUBLICITY ARTICLES

Published to March 1, 1937

- Sunset—*Warm Air in Winter, Cool Air in Summer*—New Gas Air-Conditioning for homes.
- California Federation News—*The Clubwoman's Kitchen*—Broiling on modern gas ranges—Gas refrigeration—Heat controlled gas ovens for perfect baking.
- California-Homes—*Styles in House-Warming* — Modern gas heating appliances for residential purposes.
- Keeler's Pacific Hotel Review—*Gas Fueled Ranges and Ovens*—New improvements in heavy duty gas cooking and baking.
- Pacific Laundry Journal—*Up-to-Date Plant*—Averill Morgan Co., L. A., uses gas for efficient steam generation.
- Western Confectioner—*Advocate Gas Toasting* — Modern gas toasters ideal for restaurants and lunch counters.
- Pacific Coast Record—*Economy Gas Appliances*—Influence of gas appliances in improving commercial cooking.
- Western Machinery & Steel World—*Recent Developments in Gas Furnaces and Controls.*
- Western Hotel Reporter—*Musso & Frank's, Hollywood's Oldest Restaurant, Cooks with Gas Fuel.*

WANTED

More business executives to appreciate the exclusive advantages of gas fuel for commercial and industrial use. Hence this full-page ad in *California, Magazine of Business* and *Western Machinery & Steel World.*

QUICK
CLEAN
CONTROLLABLE
DEPENDABLE
ECONOMICAL
Gas
GAS renders a universal and unfailing public service. Its benefits extend alike to public buildings, private homes and the far-flung industries that support them. ☆ Like breeze-blown pennants, its five advantages stand out for all to see: speed, cleanliness, controllability, dependability and economy—combined in no other practical fuel. ☆ No wonder California's gas consumption, for commercial and industrial uses alone, has increased over the "boom" year, 1929, by more than 45 per cent!
Whatever your heat requirements, ask this question: "Can I do it better and cheaper with gas?" Facts and figures will answer. See Your Gas Company.

P.C.G.A. Men Hold Technical Conference

THE Spring Technical Conference of the Pacific Coast Gas Association was held in the Auditorium of the Los Angeles Gas and Electric Corp. Building, Los Angeles, Calif., on March 18 and 19. Otto Goldkamp, San Diego Consolidated Gas and Electric Co., Chairman of the Technical Section, presided at the Conference, which was attended by approximately 125 delegates, both Association members and visitors, many of whom came from considerable distances. Some of the papers have been given treatment in this issue of G A S, and others will appear in later issues.

A departure from the usual procedure at such meetings was tried, in that a considerable portion of the sessions was given over to round table discussions. Facilities were provided for small group meetings, presided over by appropriate discussion leaders. Delegates selected the group discussing the topics in which they were most interested, and in some instances moved from one group to another as the discussions progressed. In this way a considerably larger number of papers and subjects were dealt with, than would have been possible in a general assembly. Any one topic could be discussed as long as desired, and a great deal of discussion developed, because of the informal atmosphere. The assembly was unanimous in its approval of this new procedure. The remainder of the time was devoted to papers and discussions of general interest. This general plan, together with pre-printing and distribution of most of the papers (making it unnecessary to read them in full at the meeting), enabled Mr. Goldkamp and his committee organization to present and successfully cover the largest program ever attempted at a regional conference. The success of the meeting was greatly enhanced by loud speaking equipment provided through the courtesy of Fred Champion of the Southern Counties Gas Co.

Transmission Committee

After the opening address on Thursday morning, by Mr. Goldkamp, the meeting was turned over to A. B. Allyne, Chairman, Transmission committee and Vice-Chairman, Technical Section, who immediately placed the meeting in round table discussions on large volume measurement, pipe protection, and compressor plants and pipelines. As a result of discussion which arose at the large volume measurement table, a resolution was next morning presented to the general assembly, by B. G. Williams, Southern California Gas Co., asking for endorsement, by the Pacific Coast Gas Association, of the California Natural Gasoline Association's Bulletin TS 354, "Tentative Standards for the Determination of Superexpansibility Factors in High Pressure Gas Measurement." The resolution was passed, and will be presented to the Board of Directors at its next meeting.

At the pipe protection table considerable discussion arose over the possible galvanic action set up by copper pipe when used for distribution lines; the general opinion was, as in former discussions, that the dangers of galvanic action apear to be more theoretical than actual. Stray-current electrolysis was also discussed, and the point made that bonding of pipes to rails or negative terminals of electric sub-stations should not be practised indiscriminately because it encourages flow of electricity on the pipes; sometimes insulating joints may be more effective.

At noon the delegates adjourned for luncheon, in the cafeteria adjacent to the auditorium. At the speakers' table Mr. Goldkamp, as toastmaster, called on N. R. McKee, Southern Counties Gas Co., vice-president of the Pacific Coast Gas Association, who welcomed the delegates on behalf of the Association. He then called on A. F. Bridge, Southern Counties Gas Co., who introduced the luncheon speaker, F. O. Suffron, supervisor Los Angeles Laboratory, American Gas Association, who spoke on the subject of "Recent Research on Gas Ranges." This work, according to the speaker, is part of the program being conducted by the American Gas Association Testing Laboratories under the guidance of the Committee on Domestic Gas Research, the gas range being given first attention because of its importance among domestic appliances. Mr. Suffron's paper will appear in a later issue of G A S.

Utilization Meetings

After the luncheon the Transmission Committee program was resumed in General Sessions. In mid-afternoon the meeting was turned over to Guy Corfield, Los Angeles Gas and Electric Corp., Chairman, Utilization Committee, and two papers by J. L. Oberseider, Los Angeles Gas and Electric Corp. and C. E. White and C. W. Stewart, San Diego Consolidated Gas and Electric Co. and a sub-committee report were presented as scheduled. Treatments of the Utilization papers are offered on Pages 17 and 36 of this issue.

In his progress report on Gas Lighting, C. A. Thorp, Los Angeles Gas and Electric Corp., sub-committee chairman, stated that studies were being made on street lighting, flood lighting, standby lighting equipment, and lights for drive-in markets, etc.

Next morning the Utilization Committee program was continued under the leadership of F. L. Moon, Los Angeles Gas and Electric Corp., who recounted the work being done in revising and enlarging the Data Book on Gas Fuel, published a few years ago by the Pacific Coast Gas Association for the information of architects and builders. In the round table discussion later in the morning, it was generally agreed that the great activity in building at the present time makes it highly desirable that this book be brought up to date as soon as possible and given wide circulation among designers and builders. Part of this work has already been done by Mr. Moon's sub-committee. J. E. C. Currens, Pacific Gas and Electric Co., in his progress report as chairman of the sub-committee on Employee Training for Customer Utilization Service, said that further reports would be submitted on methods of teaching specific subjects. R. I. Snyder, Los Angeles Gas and Electric Corp., chairman Gas Appliance Testing sub-committee, stated in his progress report that a paper would be prepared summarizing the appliance testing procedures of all gas company appliance testing laboratories that can be contacted. He also announced that at the round table there would be an unscheduled paper, by E. H. Mohr, Los Angeles Gas and Electric Corp., entitled "Calibration of Gas Range Oven Thermostats"; also one just received from Dr. F. E. Vandaveer, American Gas Association Testing Laboratories, entitled "Gas Company Laboratories."

Distribution Conference

The afternoon session was turned over to W. F. Pape, Pacific Gas and Electric Co., chairman, Distribution Committee. At the Measurement and Regulation round table discussion the topic arousing the most interest was that of "gummy" meter valves, it being brought out that these were not necessarily caused by dirty gas, but could be brought about by rapid flow through a meter with oily interior; also that odorant in the gas apparently was not a cause of gum formation. It was decided that the question "Should Large Volume Meters be Removed on a 'Mileage' Basis?" would be referred to the sub-committee on Large Volume Measurement. At the Unaccounted-For Gas table the discussion centered on the manner in which leakage mitigation work should be accounted, so as not to necessarily charge all the expense to leakage, but perhaps to credit some to decreased maintenance. Further discussion included the practise of the various companies in searching for and repairing leaks; and the various ways of prevention of leakage from old cast iron pipe joints.

At 3:15 p.m. the members reassembled in General Session for the remainder of the Distribution Committee program, which consisted of a symposium on distribution difficulties occasioned by gas main dust. Discussions were given by D. J. Smith, Los Angeles Gas and Electric Corp., on the effect of gas main dust on appliances; by R. G. Holman, of the same corporation, on methods of oil fogging for suppression of dust; and by N. L. Hoff, also of L. A. G. and E., on mathematical theories of dust transportation in gas streams. Discussing oil fogging, it was pointed out that the need of fog is greatest at the extremities of a distribution system (low pressure mains, services, and even house piping), necessitating special portable equipment for installation in governor vaults and even on parkways; also that oil fog may have a detrimental effect on meter valves. Mr. Hoff developed the conclusion that pressure, as well as velocity, is a controlling factor in dust transportation; so that to decrease velocity by raising pressure is not necessarily an answer to the problem, and, in general, velocity control to prevent dust transportation is not practicable in the average distribution system.

Mid-West Gas Men Meet This Month For 32nd Annual Convention

THE Mid-West Gas Association will hold its thirty-second annual convention on April 12, 13, and 14, at Waterloo, Iowa. Hotel Russell-Lamson will be convention headquarters.

H. M. Smith, Iowa Public Service Co., president of the Mid-West Gas Association, will open the convention, and will deliver his message at the Monday morning session. Mayor Ralph B. Slippy will welcome the delegates and H. B. Maynard, Iowa Public Service Co., assistant secretary of the Mid-West Gas Association, will respond.

A feature of the program will be a national broadcast over the N.B.C. network conducted by "The Mystery Chef" during the Tuesday morning session of the convention.

The following program has been prepared:

MONDAY, APRIL 12

Morning

Call to Order—H. M. Smith, Iowa Public Service Co. President, Mid-West Gas Association.

Welcome to Waterloo—Ralph B. Slippy, Mayor.

Response—H. B. Maynard, Iowa Public Service Co. Assistant Secretary, Mid-West Gas Association.

The President's Message—H. M. Smith, President, Mid-West Gas Association.

"Let's Look Into the Future"—Major Alexander Forward, Managing Director, American Gas Association.

"Modernizing the Kitchen"—Edna Van Horn, Assistant Editor, *Better Homes and Gardens.*

Committee Reports—Report of the Secretary-Treasurer, report of the Auditing committee, election of new members, report of the Nominating committee, election of officers.

Afternoon

Report of Manufacturers' Representative A. G.A.—F. L. Banner, Minneapolis-Honeywell Regulator Co.

"Advertising Gas Cookery"—C. A. Nash, vice-president in charge of Sales Promotion, The United Light and Power Engineering and Construction Co.

"Comparative Selling"—E. C. Sorby, Geo. D. Roper Corp.

"Uniform Classification of Customers' Complaints"—H. C. Holder, manager, Council Bluffs Gas Co.

"Changes Occurring in a Distributing System as a Result of Changes in Characteristics of Gas Supplied"—C. D. Robison, operating engineer, Metropolitan Utilities District.

TUESDAY, APRIL 13

Morning

Gas refrigeration:

"Domestic Refrigeration"—R. L. Robertson, Minneapolis Gas Light Co.

"Commercial Refrigeration"—Carl Conkey, Sales Manager, Servel, Inc.

"Gas Still Stands Unchallenged"—The Mystery Chef (in person) will broadcast over the N.B.C. network directly from the convention platform.

"The Development of Automatic Gas Engine Power Units"—C. G. Callow, Waukesha Motor Co.

Report of Technical Representative A.G.A.—Lester J. Eck, Minneapolis Gas Light Co.

Afternoon

Report of Industrial Representative A.G.A.—A. H. Abbott, Northern States Power Co.

"Gas Load Building with Water Heating"—F. C. Armbruster, Middle West Service Co.

"Water Heating by Conversion Type Heaters"—J. H. Fagan, J. H. Fagan Co., Milwaukee, Wis.

Coming Developments—Floyd W. Parsons, editorial director, *Gas Age-Record and Natural Gas.*

Evening

Annual Banquet—At "The Tavern on the Green."

WEDNESDAY, APRIL 14

Morning

Report of Accounting Representative A.G.A.—E. H. Vieregg, Central Power Co.

"Chimney Problems and What to Do about Them"—J. E. Swenson, Minneapolis Gas Light Co.

"The Gas Industry's Place in Air Conditioning both Winter and Summer"—Lyle C. Harvey, vice-president and general manager, The Bryant Heater Co.

"Househeating Sales and What the Salesman Should Promise"—F. L. Kline, Des Moines Gas Co.

"Service to Househeating Equipment"—P. K. Tucker, Sioux Falls Gas Co.

Indiana Gas Association Convention Scheduled for Muncie, April 28-29

ONE of the best attended conventions held by the Indiana Gas Association in many years is anticipated when the Association meets at the Hotel Roberts, Muncie, on Wednesday and Thursday, April 28 and 29. Herman Russell, president of the Rochester Gas & Electric Corp. and president of the American Gas Association, will be a featured speaker.

L. C. Heavner, Northern Indiana Public Service Co., is president and will speak at the opening session Wednesday morning. P. A. McLeod, Public Service Co. of Indiana, secretary-treasurer of the Association, will make his report at this session.

The following tentative program is furnished to *GAS* by Secretary McLeod:

Wednesday, April 28

1:30 p.m.

"Economics of the Domestic Load and Consumer Research"—Herman Russell, President, American Gas Association.

2:30 p.m.

Symposium—"Have We in Indiana Kept Pace?"—C. V. Sorenson, Public Service Co. of Indiana, chairman; J. Sackman, Northern Indiana Public Service Co.; E. Peabody, Central Indiana Gas Co.; W. Smiley, Public Service Co. of Indiana; E. Weston, Indiana Gas Utilities Co.; E. Lundgren, Bozell and Jacobs, Inc.

Discussion: C. D. Porter, Public Service Co. of Indiana; F. B. Culley, Southern Indiana Gas & Electric Co.; T. L. Kemp, Citizens Gas & Coke Utility; D. H. Mitchell, Northern Indiana Public Service Co.; H. V. Armstrong, Indiana Gas Utilities; H. Carl Wolf, Central Indiana Gas Co.

4:30 p.m.

"My Conception of Home Service"—Dorothy Shank, Director of Research Kitchen, American Stove Co., Cleveland, Ohio.

6:30 p.m.

Informal Banquet—Speaker: Floyd Parsons.

Thursday, April 29

9:00 a.m.

"Unaccounted for Gas"—J. M. Pickford, Northern Indiana Public Service Co.

Discussion: D. S. Martin, Citizens Gas & Coke Utility; J. A. Mishler, Public Service Co. of Indiana; T. J. Kelly, Public Service Co. of Indiana; Phillip Rector, Central Indiana Gas Co.

10:00 a.m.

Symposium: "Rehabilitating Flooded Gas Properties"—R. V. McGuire, Public Service Co. of Indiana; F. A. Schaefer, Public Service Co. of Indiana.

11:00 a.m.

"Employee Education"—Professor Bray, Purdue University.

Discussion: Phillip Rector, Central Indiana Gas Co.; F. Kussmaul, Northern Indiana Public Service Co.; E. J. Hendrickson, Citizens Gas & Coke Utility.

1:30 p.m.

"The Effect of Recent Legislation on the Accounting Department"—J. A. Kennedy, Northern Indiana Public Service Co.

2:30 p.m.

Report of Committees: Technical, Industrial Gas, Commercial, Accounting, and Advertising.

Report of Purdue Gas School.

3:30 p.m.

Election of Officers.

■ ■

Wallace Joins Foxboro Staff

Bruce B. Wallace has joined the staff of the Los Angeles, Calif., office of the Foxboro Co., Foxboro, Mass., makers of industrial precision instruments. Mr. Wallace will work out of Los Angeles as a sales engineer.

SEASON of cleaning and renovating . . . season, also, of bright, new "model homes" with their supremely modern kitchens, laundries, baths. A good season, we think, to push that indispensable aid to cleanliness, the Automatic Storage-type Water Heater. And so we will. Fortified by our advertising, your own efforts along this line can hardly fail. Details of our spring Water Heater promotion will be found in the May Dealer Letter. Read—plan—then ACT!

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

Owned · Operated · Managed by Californians

WG 204-437

Missouri Utilities Meeting Scheduled for April 21-23

THE annual convention of the Missouri Association of Public Utilities will be held April 21, 22 and 23, at the Elms Hotel, Excelsior Springs, Mo. C. E. Michel, president of the Association, will preside at the business sessions, and at the annual dinner on April 23.

Governor Harold G. Hoffman of New Jersey and C. W. Kellogg, president of the Edison Electric Institute, will address the convention.

Among the other speakers will be: Robert W. Hendee, manager, Colorado Interstate Gas Co.; Grover C. Neff, Wisconsin Power & Light Co.; Dr. Harry F. Parker, state health commission of Missouri; H. C. Blackwell, Cincinnati Gas & Electric Co.; Conrad H. Mann, Kansas City, Mo.; S. B. Williams, managing editor, *Electrical World;* D. L. Fennell, Kansas City Public Service Co.

Among the subjects of the speakers will be: "The Gas Industry Looks Ahead"; "Accident Prevention"; "How Utilities Can Share to the Fullest Extent in the Current Business Upturn"; "Maintaining Utility Service under Flood Conditions"; and "The Utilities' Place in Community Life."

A safety meeting and round table discussion of accident prevention will be held on April 21 under the auspices of the Accident Prevention committee, of which John J. Barada, Laclede Gas Light Co., is chairman.

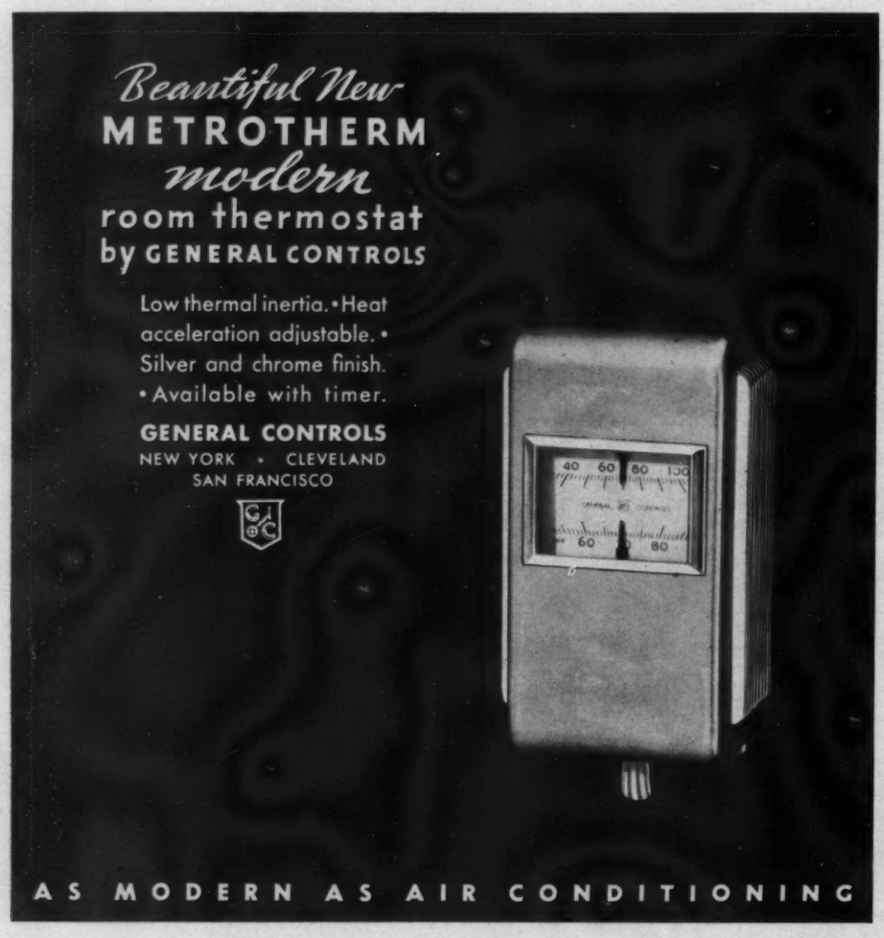
The annual Open Forum will be held on the evening of April 22. E. D. V. Dickey, president of the Citizens Gas Co., will serve as chairman. The two principal subjects to be discussed will be "Fitting the Employee to the Job" and "Company Practices in Maintaining Customer-Owned Appliances."

The annual statewide speaking contest for employees of gas, electric and water companies belonging to the Association will be held on the evening of April 21. There will be separate contests for men and for women. The subjects will be: For men: "Service, Today's Greatest Opportunity"; for women: "Creating Satisfied Customers." Cash prizes will be awarded. Eight companies will have contestants.

■ ■

Industrial Gas Sales Group Meets in Chicago, June 8-9

The National Industrial Gas Sales Conference will be held by the Industrial Gas Section of the American Gas Association in conjunction with the Mid-West Industrial Gas Sales Council at the Palmer House, Chicago, Ill., June 8 and 9. The program is being prepared by the Program Committee of the Industrial Gas Section of the American Gas Association. In direct charge of the preparation of this program is Frank H. Trembly, Jr., Philadelphia Gas Works Co., Philadelphia, Pa., assisted by a special Program Committee of the Mid-West Council under the leadership of D. W. Chapman, Peoples Gas Light & Coke Co., Chicago, Ill.



Two Meetings on New England Gas Assn. Calendar

THE Industrial Division meeting of the New England Gas Association, scheduled to meet in Boston on March 26, as this issue of GAS went to press, was to feature a talk by Charles H. O'Donnell, Boston Consolidated Gas Co., on "Placing Gas Heat in New Homes."

Following Mr. O'Donnell's address, a skit was scheduled entitled, "Selling Gas for Househeating." Written by Walter McCrea and Gerald Thompson, Cambridge Gas Light Co., the skit showed how the objection, "It is too expensive," can be successfully refuted.

The Sales Division of the New England Gas Association was scheduled to meet April 2, at the Hotel Statler, Boston.

R. L. Fletcher, vice-president of Providence Gas Co., and president of The New England Gas Association, was to speak on "Making Sales in 1937." Other speakers listed on the advance program were Hall M. Henry, chairman of the A. G. A. Refrigeration committee, who is assistant to the vice-president of the Utility Management Corp.; E. Hosp of Batten, Barton, Durstine & Osborn, Inc., New York, and George S. Jones, Jr., vice-president and general sales manager of Servel, Inc.

■ ■

Plan First Annual Porcelain Enamel Institute Forum

Plans for the first annual Porcelain Enamel Institute Forum, to be held May 5, 6 and 7 at the University of Illinois, are rapidly nearing completion. The Forum will be open to everyone in the porcelain enameling and related industries.

Prominent among the speakers, in addition to the technical program, will be Robert G. Calton of the Tennessee Enamel Manufacturing Co., president of the Institute, and the two Institute vice-presidents—F. E. Hodek, Jr., of the General Porcelain Enameling & Manufacturing Co., and E. L. Lasier of the Titanium Alloy Manufacturing Co.

Commenting on the Forum program, Mr. Hodek, who is chairman of the committee in charge of the Forum, stated that outstanding men in all branches of the industry had been obtained as speakers. Following the Forum, complete proceedings will be published by the Institute. A large attendance is anticipated.

■ ■

Kitchen Planning Bulletin Is offered by A. G. A.

How to go about planning a kitchen is the subject matter of Interim Bulletin No. 3, "Approach to Kitchen Planning," published by the American Gas Association. It was prepared by Harry Swenson, home modernization counsellor, Commercial Section.

Points covered include the building of a file of material on kitchen planning, holding a kitchen clinic demonstration, and the use of color. The Commercial Section of A. G. A., through the home modernization counsellor, will answer questions on kitchen planning.

300 Attend Section Meetings of Wisconsin Association

NEARLY 300 gas men attended the meeting of the Gas Section, Commercial and Technical Divisions, of the Wisconsin Utilities Association held on March 15, 16 and 17, at the Schroeder Hotel, Milwaukee, Wis. This was the first time that a section meeting had been held apart from the general conference of the Utilities Association.

A manufacturers' exhibit was conducted simultaneously with the convention. An inspection trip to the meter shop of Milwaukee Gas Light Co., conducted by E. C. Hermes, and a home show at the Milwaukee Auditorium were also on the program.

T. J. Danchy, Wisconsin Fuel & Light Co., Manitowoc, Section Chairman, addressed the opening joint session. R. B. Brown, president, Milwaukee Gas Light Co., spoke on the national advertising program.

During the convention, William E. Leverette, commercial manager, Nashville Gas & Heating Co., Nashville, Tenn., talked on "Meeting T. V. A. Competition." Floyd W. Parsons, editorial director, *Gas Age-Record,* spoke on "Future of the Gas Industry."

Aims of the American Gas Association Testing Laboratories pertaining to sales maintenance and customer relations were set forth by R. M. Conner, director of the Laboratories at Cleveland.

Elections were held as scheduled. Those nominated by the Gas Section nominating committee were E. C. Brenner, Milwaukee Gas Lighting Co., as chairman, and Frank Wilkinson, Northern States Power Co., La Crosse, as vice-chairman.

■ ■

October Set for Bureau of Standards Corrosion Meeting

The fourth conference on the corrosion and protection of pipe lines will be held at the National Bureau of Standards, Washington, D. C. in October, 1937. The purpose of this conference is to facilitate the exchange of ideas between men engaged in the reduction of corrosion losses. Attendance is limited to those directly concerned, and all who participate in the conference are required to present unpublished papers or reports dealing with corrosion experience. Anyone offering an acceptable paper is welcomed at the conference. Further details can be secured from K. H. Logan, Chief of the Underground Corrosion Section, Bureau of Standards, Washington, D. C.

■ ■

P.C.G.A. Northwest Group To Meet June 24 and 25

The regular Northwest Conference of the Pacific Coast Gas Association will be held in Seattle on June 24 and 25, according to announcement made by Mr. J. F. Pollard, president of the association.

■ ■

Texas Natural Appointment

Texas Natural Gas Utilities, Houston, Texas, has named Jack Bond as manager of the Wharton office.

"ENSIGN"

THE NATURAL GAS CARBURETOR

Type Kgl Ensign Natural Gas Carburetor — adaptable to a wide range of engines, both old and new models.

ENGINEERED To Meet Natural Gas REQUIREMENTS

Back of the Ensign Natural Gas Carburetor . . . back of ALL Ensign Natural Gas Equipment . . . is long and comprehensive laboratory research and field experimentation in the use and handling of Natural Gas as a fuel. As a result, there is BUILT INTO Ensign equipment the NECESSARY simplicity, dependability, and ease of starting . . . and Ensign PRECISION-CONSTRUCTION results in improved operation and added economy.

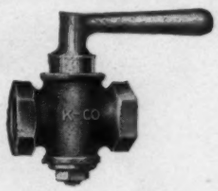
"Service-wise" design and service-proved performance have brought Ensign Natural Gas Equipment into popular use wherever natural gas is available. The Ensign line is the most complete line of natural gas carburetors and fuel regulators on the market. For these reasons Ensign is your logical source of authoritative engineering assistance, your logical source of natural gas equipment.

Butane Equipment; Gasoline Carburetors for Industrial Engines and Tractors.

Ensign Carburetor Company, Ltd.

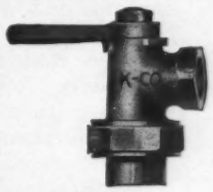
Huntington Park, California

Chicago Branch: 2644 So. Michigan Avenue. Distributors with Stocks: A. W. Schuller, Inc., Tulsa, Okla.; The Binkley Company, Oklahoma City, Okla.; Portable Rig Company, Houston, Texas; H. G. Makelim, Oakland, Calif.; T-V Supply Company, Wichita, Kansas.



G-207—Solid Lever Standard Gas Stop

"by Kitson" . . . The Surest Guarantee of Quality for Forty Years!



G-250—Angle Pattern Stop with Coupling

K-CO TRADE MARK

KITSON COMPANY

2409-15 Westmoreland St. Philadelphia, Pa.

Kitson Safety Devices (Lovekin Patents) for Domestic Water Heaters

Quality Brass Goods for Gas, Water and All Plumbing Uses

ESTABLISHED 1897

K-CO TRADE MARK

Washington, D. C., Is Scene of Annual Distribution Conference This Month

THE fourteenth annual Distribution Conference of the American Gas Association will be held at the Wardman Park Hotel, Washington, D. C., on April 12, 13 and 14. An inspection trip to the National Bureau of Standards, which is co-operating with A. G. A. on a number of research projects, is one of the high lights scheduled during the convention. It will follow an explanation of the Bureau's research facilities and work.

D. P. Hartson, Equitable Gas Co., Pittsburgh, Pa., is chairman of the Distribution Committee. Marcy L. Sperry, president, Washington Gas Light Co., Washington, D. C., will welcome the gas men. The tentative program is announced as follows:

Monday, April 12

The Distribution Man's Part in the House Heating Program—H. B. Johns, The Peoples Gas Light & Coke Co., Chicago.

Shade Tree Protection—A. Gordon King, American Gas Association.

Round Table Luncheon Conferences: Meters—H. B. Andersen, chairman. Customer Service (including house or appliance regulators)—R. H. Taylor, chairman. Pipe—L. W. Tuttle, Public Service Co. of Northern Illinois, Oak Park, Ill., chairman. Portable Equipment—E. H. Eacker, Boston Consolidated Gas Co., chairman. Employee Training—H. G. Horstman, Public Service Co. of Indiana, Indianapolis, Ind., chairman.

Tuesday, April 13

Pipe Coating & Corrosion Committee—C. F. Turner, The East Ohio Gas Co., Cleveland, Ohio, chairman.

Some Corrosion Notes—Dr. Scott Ewing, research associate, National Bureau of Standards, Washington, D. C.

The Theory and Use of Cathodic Protection—A. V. Smith, The United Gas Improvement Co., Philadelphia, Pa.

Determination of Leaks in Gas Mains—E. F. Schuldt, The Peoples Gas Light Coke Co., Chicago.

Inspection trip to National Bureau of Standards.

Wednesday, April 14

Committee on Meters and Metering—D. P. Allen, Washington Gas Light Co., Washington, D. C., chairman.

Committee on Pipe Joints and Pipe Material—L. W. Tuttle, Public Service Co. of Northern Illinois, Oak Park, Ill., chairman.

Further Use of Carboseal for Reducing Joint Leakage—R. E. Finley, Dayton Power & Light Co., Dayton, Ohio.

Determination of Moisture Content in Gas and the Effect of Varying Humidities on Volumetric Correction Factors—S. P. Cobb, Ebasco Service Inc., New York, N. Y.

Changes Occuring in a Distribution System as a Result of Changes in the Characteristics of the Gas Supplied—C. D. Robison, Metropolitan Utilities District, Omaha, Neb.

Gas Main Structural Strength Committee—Erick Larson, Long Island Lighting Co., New York, N. Y., chairman.

Cast Iron Pipe Standards Committee—C. C. Simpson, Consolidated Edison Co. of New York, N. Y., chairman.

Open Forum—Summaries of luncheon conferences.

■ ■

P. C. G. A. Sales and Ad Men Meet in Los Angeles

THE FIRST DAY of the Spring Sales and Advertising Conference of the Pacific Coast Gas Association, which was held in Los Angeles, Calif., on April 1 and 2, was devoted to round table conferences. Following the opening remarks of B. W. Reynolds, Pacific Gas and Electric Co., San Francisco, general chairman, the following round table discussions were held.

Domestic Sales—N. O. Fratt, Seattle Gas Co., chairman.

House Heating Sales—R. J. Phillips, San Diego Consolidated Gas and Electric Co., leader.

Education of Dealer Salesmen—R. W. Dow, Southern California Gas Co., Los Angeles, leader.

Reaching the Builder in Time—J. S. C. Ross, Pacific Gas and Electric Co., leader.

Employee Selling—C. A. Renz, Los Angeles Gas and Electric Corp., leader.

Does a Kitchen Planning Service Help Sales? — Katherine Rathbone, Southern Counties Gas Co., leader.

Dealer Subsidies for Advertising and Sales Compensation — W. H. Howe, Tucson Gas, Electric Light and Power Co., Tucson, Ariz., leader.

Sales Statistics—F. U. Naylor, Pacific Gas and Electric Co., leader.

Trade-In Appraisal Control—O. A. Rush, Pacific Gas and Electric Co., leader.

Commercial and Industrial Sales—R. T. Stephens, Pacific Gas and Electric Co., chairman.

What's Ahead for Commercial Heating?—Louis Wollenberger, Coast Counties Gas and Electric Co., Santa Cruz, Calif., leader.

Is There a Field for Gas Air-Conditioning in Commercial and Industrial Plants?—J. H. Hill, Pacific Gas and Electric Co., leader.

Will This Be a Gas Engine Year?—Manley H. Clark, Southern Counties Gas Co., leader.

Visual Commercial Cooking—George Heckler Southern California Gas Co., leader.

Gas for Metal Melting and Heat Treating—E. H. Adler, San Diego Consolidated Gas and Electric Co., leader.

Industrial Data Bulletins: Their Use and Value in Sales Promotion—C. C. McRae, Pacific Gas and Electric Co., leader.

Home Service—Gladys Price, Southern California Gas Co., chairman.

Home Service Co-operation in Equipping Public School Laboratories—Ruth Kruger, Central Arizona Light and Power Co., Phoenix, Ariz.

100 Pounds or More Cut to Medium or Low Pressure

CF

GAS pressures of 50 to 100 pounds or more in tanks or transmission lines are reduced to medium or low pressure in the distribution system by the Fulton Toggled Reducing Regulator. It can be equipped to operate with either natural or manufactured gas, maintaining the desired delivery pressure. Constructed with oversize valves, for industrial furnace installations. Also adapted for control of By-Product Coke Oven Gas. Catalog on request.

Fulton Toggled Reducing Regulator

THE CHAPLIN-FULTON MFG. CO.

28-40 Penn Avenue **Pittsburgh, Pa.**

Development of Newspaper Cooking Schools
Margaret Lackland, So. Counties Gas Co.
Home Service Co-operation in Employee Education—Victoria Warner—R. V. Davis, Los Angeles Gas and Electric Corp.

Advertising—J. S. Spaulding, Los Angeles Gas and Electric Corp., chairman.

What Advertising Value Have Community Newspapers to Utility Companies?—J. S. Spaulding, leader.

General sessions on the second day included a discussion of the Highlights of Home Service, in charge of Gladys Price, Southern California Gas Co., and committee reports.

At luncheon on the first day, Frank Whitbeck, advertising director for Metro-Goldwyn-Mayer, spoke on "Showmanship in the Gas Industry." The next day at luncheon, the Addison B. Day Medal of Honor was presented to John H. Grayson, inventor.

All sessions were held in the building of the Los Angeles Gas and Electric Corp.

■ ■

Advantages of Natural Gas Over Diesel Engines

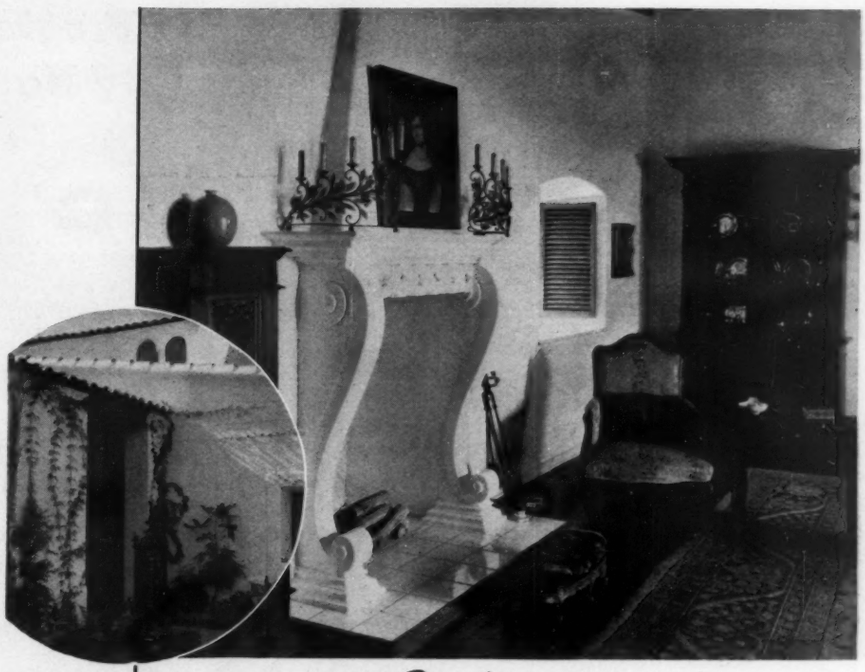
(Continued from Page 32)

Due to the high pressures in the Diesel engine, we obtain the following injurious results:

1. Greater wear on all bearing surfaces.
2. Greater maintenance on cylinder walls, due to abrasive action of carbon between cylinder and piston.
3. Poorer lubrication to cylinder and piston, due to blowing out of lubrication film from between piston and cylinder due to high pressures in combustion chamber.
4. Shorter life, due to greater maintenance.

While it is true that the cost of fuel in the smaller Diesel engines is considerably less than that for gas in the gas engines, this is more than over-balanced during the useful life of the engine by the lower first cost of the gas engine, lesser maintenance, and the very much more dependable service, which, after all, is very important. We have records of many gas engines that have operated continuously over 12 months without a forced shut-down. This is impossible with a Diesel.

Some of the gas companies render free service to users of gas engines on their systems, which service alone usually pays for the difference in fuel cost. In Southern California, where natural gas is available, there is installed and in operation about 600,000 hp. in natural gas engines, of which approximately 25 per cent is in agricultural and industrial service; the balance being used in the oil industry. In this same territory, where natural gas was available when engine was purchased and when eliminating the Diesel plants of the cities of Los Angeles and Vernon, whose engines are too large (7,000 hp. each) to be available in gas engines; there are so few Diesel engine installations that they can be counted on one's fingers, and they total less than 2,000 hp. This difference in the number of each type of engine in use is great, and there is a reason for it. It is that the gas engine is more dependable and just as economical over the entire length of its useful life, and it is for these reasons that the gas engine is preferred over the Diesel engine when gas is available at the low rates in effect in Southern California.



Home of Mme. Galli-Curci at 201 Tilden Ave., Westwood Village. Wallace Neff, Architect.

ANOTHER *Pacific Heated* HOME

Famed Opera Star Chooses Pacific Forced-Air Heating . . . Occupying a beautiful site near Los Angeles, the new home of Mme. Galli-Curci is like a bit of Italy transplanted to sunny California. Here the famous opera star has surrounded herself with many precious objects collected during her long and glorious career.

To assure complete personal comfort, a Pacific Forced-Air System has been installed with automatic control. Today these systems are being installed against every type of competition. They are the gas executive's best load-building weapon. Write for latest catalog G-4.

PACIFIC GAS RADIATOR COMPANY

1740 West Washington Blvd., Los Angeles, California

See our exhibit at the A.G.A.E.M. Convention at Kansas City, May 10 to 14 incl.

U. S. SUPER de LAVAUD CAST IRON PIPE

"Cast without chill in a metal mold"

U. S. PIPE AND FOUNDRY COMPANY
Burlington, N. J.

Instantaneous . . .

100% Shut-Off

with the new Domestic automatic pilot valve for water heaters which shuts off the pilot as well as the main supply. After operating it is reset merely by turning a button.

Appliance manufacturers are invited to write for particulars.

Domestic Manufacturing Co.
700 E. Florence Ave. Los Angeles, Calif.

The word for Quality in a Gas Pressure Regulator is

"BARBER"

Made in ¼", ⅜", ½", ¾", 1", 1¼", 1½" and 2" sizes.

Built to exacting standards of precision, Barber Regulators have the responsiveness and accuracy of operation that are beyond price. Gas-tested for operation within three-tenths pressure drop and rigidly inspected. Approved by A. G. A. Neat and compact design, all-bronze bodies, a quality product in every detail. Yet Barber Regulators are sensibly priced! Write for complete literature, prices and discounts on the Barber line of Conversion Burners, Appliance Burners, Controls and Regulators.

The Barber Gas Burner Co.
3704 Superior Avenue Cleveland, Ohio
The Barber Gas Burner Co. of Michigan
4475 Cass Avenue, Detroit, Michigan

Diversified Program Announced For Kansas City Natural Gas Meeting

(Continued from Page 21)

NATURAL GAS UTILIZATION AND SALES PROMOTION

WEDNESDAY AFTERNOON MAY 12, 1937

F. M. BANKS, Chairman

Developments in Commercial and Domestic Air Conditioning—L. A. Bickel, Dallas Gas Co., Dallas, Texas.

Discussion—Carl Dean, Oklahoma Natural Gas Co., Tulsa, Okla., and E. H. Lewis, St. Louis County Gas Co., St. Louis, Mo.

Employee Selling—S. B. Severson, Republic Gas Light and Heat Co., Buffalo, N. Y.

Discussion—Frank Rainey, Ohio Fuel Gas Co., Columbus, Ohio, and Jerry Ames, Western United Gas Co., Aurora, Ill.

Value of Aggressive Sales Programs—M. W. Arthur, Consumers Power Co., Pontiac, Mich.

NATURAL GAS UTILIZATION AND SALES PROMOTION

THURSDAY AFTERNOON MAY 13, 1937

F. M. BANKS, Chairman

Gas Refrigeration Sales Activities—W. M. Jacobs, Southern California Gas Co., Los Angeles, Calif.

Discussion—C. B. Wilson, Little Rock Gas and Fuel Co., Little Rock, Ark.

A Review of New Designs and Developments in Domestic Appliances Now Available—Lyle C. Harvey, Bryant Heater Co., Cleveland, Ohio.

Water Heaters—L. M. Taylor, Mississippi Power and Light Co., Jackson, Miss.

House Heating—Frank L. Adams, Public Service Co., Denver, Colo.

NATURAL GAS TRANSMISSION COMMITTEE

THURSDAY AFTERNOON MAY 13, 1937

F. F. DOYLE, Chairman

SYMPOSIUM

Recent Developments in Gas Compression Machinery (To include Radial and Rotary Engines)—H. N. Mallon or Harry Norton, S. R. Dresser Manufacturing Co., Bradford, Pa.

Discussion—T. H. Kerr, Columbia Gas and Electric Co., Columbus, Ohio; S. C. Preston, Peoples Natural Gas Co., Pittsburgh, Pa.; and B. C. Comfort, Mississippi River Fuel Co., St. Louis, Mo.

Recent Developments in Gas Compression Machinery—J. S. Fulton, Ingersoll Rand Co., New York, N. Y.

Discussion—Allis-Chalmers Co., Milwaukee, Wis.; George T. Koch, Panhandle Eastern Pipe Line Co., Kansas City, Mo.; and H. J. Carson, Northern Natural Gas Co., Omaha, Neb.

Recent Developments in Gas Compression Machinery—F. T. Hudgins, General Sales Manager, Cooper-Bessemer Engine Co., Mount Vernon, Ohio.

Recent Developments in Gas Compression Machinery—W. L. Russell, Manager, Gas and Oil Power Sales Division, Worthington Pump and Machinery Co., Harrison, N. Y.

Recent Developments in Gas Compression Machinery—Speaker from Clark Brothers, Olean, N. Y.

INDUSTRIAL GAS CONFERENCE

THURSDAY AFTERNOON MAY 13, 1937

FRANK TREMBLY, Chairman

Specialized Selling of Natural Gas—F. B. Jones, Equitable Gas Co., Pittsburgh, Pa.

Discussion—D. W. Chapman, Peoples Gas Light and Coke Co., Chicago, Ill.; Louis Hungate, Memphis Power and Light Co., Memphis, Tenn.; and A. T. Code, East Ohio Gas Co., Cleveland, Ohio.

Obtaining the "marginal" Industrial and Commercial Load Obtained by Most Manufactured Gas Utilities but Often Overlooked by Natural Gas Utilities—Speaker from a Pacific Coast company.

Natural Gas in the Heavy Heating Industries—C. L. Brockschmidt, Mississippi River Fuel Corp., St. Louis, Mo.

Discussion—Karl Emmerling, East Ohio Gas Co., Cleveland, Ohio; T. E. Wood, Manufacturers Light and Heat Co., Pittsburgh, Pa.; W. W. German, Montana Power Co., Butte, Mont.; A. F. Mitchell, Northern Indiana Public Service Co., Hammond, Ind.; and R. P. Kramer, Atlanta Gas Light Co., Atlanta, Ga.

A Discussion of Steel, Glass, China, Brick and Cement Kilns—J. H. Gunz, Pacific Gas and Electric Co., San Francisco, Calif.

Gas Engine Selection and Applications of 5 kw. or Above—E. J. Hatzenbuehler, Lone Star Gas Co., Dallas, Texas.

Discussion—Edwin Snook, Amarillo Gas Co., Amarillo, Texas; Dwight Edwards, Oklahoma Natural Gas Co., Tulsa, Okla.; E. E. McCormick, Peoples Natural Gas Co., Pittsburgh, Pa.; and W. J. MacIntyre, Louisiana Arkansas Gas Co., Shreveport, La.

Increased Efficiency of Gas Power Boilers—Louis H. Hungate, Memphis Power and Light Co., Memphis, Tenn.

Discussion—Worden Pope, Public Service Co. of Colorado, Denver, Colo.; L. S. Regan, Webster Engineering Co., Tulsa, Okla.; Charles M. Rogers, New Orleans Public Service, Inc., New Orleans, La.; and a Pacific Coast speaker discussing irrigation.

Developments in Commercial and Domestic Air Conditioning—L. A. Bickel, Dallas Gas Co., Dallas, Texas.

■ ■

Jacob C. Groble Dies

Jacob C. Groble, well known in the gas industry as the manufacturer of a line of gas regulating devices, which was taken over by the Mueller Co. about three years ago, died recently in Anderson, Ind.

Personalizing Customer Contacts

(Continued from Page 34)

uct of the Service Representative Plan—the prime purpose of which is, of course, betterment of service through personalization of customer contacts—is increased efficiency resulting from the centralization of records. With the complete history of the customer's account at his elbow, the Service Representative is equipped to handle any phase of the customer's telephone service without the necessity, in practically all cases, of having to call, say, the accounting department to ascertain current status of the account. The customer is then not left waiting on the line or is not shuttled back and forth among several departments and needs to state his case only once. Thus the load (number of accounts) that the customer contact employee is able to carry is greatly increased through savings in time and motion. The Service Representative is the focal point of all the telephone company's facilities from the standpoint of the customer; all negotiations for the given group of accounts are co-ordinated at his desk.

Supervision Simplified

The Service Representative Plan has resulted in a further economy through simplification of supervision over the handling of customer contacts. Periodically each Service Representative's line is observed by a coach who notes his manner and thoroughness in dealing with a customer. Weak points in an employee's procedure are detected and reported to the office manager charged with the supervision over the Service Representatives in his office. The manager must then correct these faults through instruction. Since each Service Representative is responsible for his group of accounts and is checked through observation, the number of customer contact employees that a manager can supervise effectively is greatly increased. The office manager reports to his district manager.

Errors noted by the observer are charged against that district as service errors. When the volume of these makes it advisable, retraining is given the Service Representatives of the district. Retraining requirements are met through group training off the job or through the use of coaching procedure.

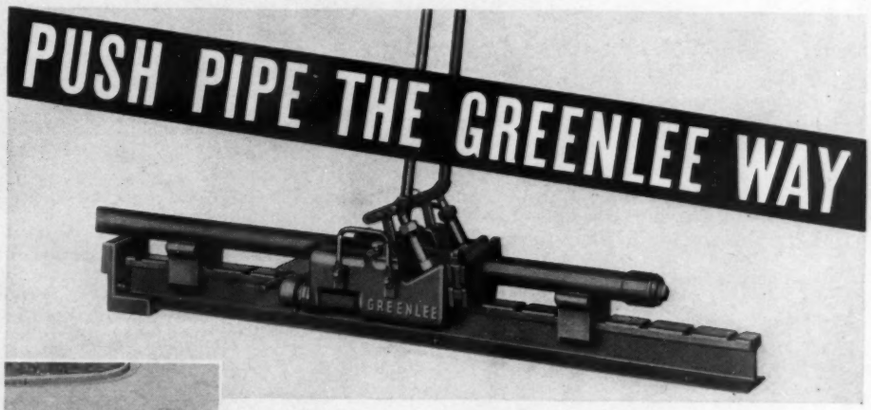
In the selection of Service Representatives it has been found to be desirable to choose persons who have had at least a high school education or its equivalent and who, in addition, have the ability to express themselves well. They may be either men or women. As a general rule it is believed that women are preferable, although positions are filled also with men who show prospect for advancement to provide managers with this background of experience.

Thorough training is essential and it has been found that the initial training can be accomplished most effectively through the use of a training manual and practice case material. Emphasis is placed upon practice in handling the work. Although the length of the training course depends upon the experience and ability of the students, the telephone companies extend it to as much as fourteen weeks. Experience has indicated that a minimum of eight weeks is required.

Students are given a complete grounding in the organization and general policies of the company. They are instructed in the divisions of the exchange and in the types of service offered. This preliminary phase of the training consumes about a week, after which the students are turned to the task of handling practice calls. The sale of service, together with the service incident to such sales and the charges therefor, are covered throughout the entire training period.

If service is to be cordially helpful, it must also be such as to encourage the customer to submit his problems freely with confidence in receiving assistance and it must also be productive of suggestive advice from the company representative as to the kind of telephonic arrangement which will best suit the needs of the subscriber. It is the achievement of this goal that is stressed in the training and retraining of Service Representatives.

As previously stated, the Service Representative Plan has resulted in greatly increased efficiency in customer dealings as well as a bettered quality of service. These considerations are in addition to improved public relations, improved sales figures, improved collections, over the companies' former system of segregated departments.



Above is the Greenlee Hydraulic Pusher set up for pushing pipe under a paved street. One man, standing in a comfortable position, can exert a pressure of 40,000 pounds on the pipe clamp.

Saves Time and Money

If you are using a pipe pusher that requires several men to operate it, you can save considerable time and money by putting a Greenlee Hydraulic Pusher in service. And if you are making underground installations by trenching, you can save still more. No longer is it necessary to tear up lawns and pavement or to do extensive trenching, back-filling, etc.

With the Greenlee, it is only necessary to make a trench long enough to accommodate the pusher with a section of pipe, and one man can send it where it is wanted, simply by pumping the handles. Eight speeds are provided for varying soil conditions, and a push of from 4 to 7 feet can be made, depending on the length of base used, without changing the pipe clamp.

Investigate this improved method of pushing pipe for gas or any other purpose. Complete information will be sent, gladly.

GREENLEE TOOL CO., 1700 Columbia Ave., ROCKFORD, ILL.

GREENLEE TOOL CO., 1700 Columbia Ave., Rockford, Ill.

Please send complete details on the Greenlee Hydraulic Pipe Pusher.

Company .....

Address .....

City ..... State .....

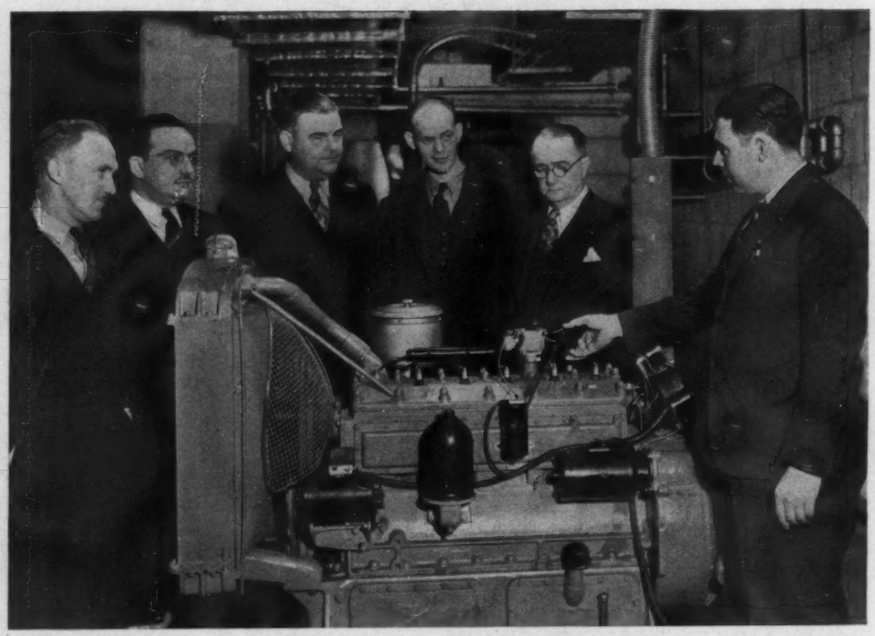
By G4-37

Gas for WOOD! with
GLO-FIRE
APPROVED ODORLESS GAS LOG

Odorless
Realistic
Economical
Circulating Heater
A.G.A. Approved

Slotted venturi type burner and new double combustion principle make Glo-Fire the perfect heater for the fireplace.

WRITE TODAY FOR DETAILS
EXCLUSIVE DISTRIBUTORS
COLONIAL SHOPS
Glo-Fire Sales Division
3350 W. FIRST ST. LOS ANGELES, CAL.



W. G. Durant, project engineer and one of the staff designers of the new Lycoming electrical generation engines, discusses distinctive features with Los Angeles sales and service officials. Left to right: Norman Williams, service and maintenance manager; C. F. Chandler, sales manager; H. V. Snodgrass, sales representative; Jhan Van Hiel, application engineer; and Charles A. Clark, general manager.

Lycoming Co. Creates Industrial Division to Handle Gas Engines

WITH the arrival at Los Angeles of an initial shipment of engines from its main plant at Williamsport, Pa., the newly created Industrial Division of the Lycoming Manufacturing Co. swung into full activity this month. The shipment included stationary, irrigation, oil-well pumping, and electrical generation units.

Sales and service headquarters, together with warehouse facilities, have been established by General Manager Charles A. Clark in the Auburn-Cord building on Wilshire Boulevard. A demonstration section has been installed in the basement, where with other installations, are the two dual-engined 60 kw. electrical generation units furnishing power and light for the Auburn-Cord Building. Project Engineer W. G. Durant installed the units. C. F. Chandler is local sales manager.

Lycoming's industrial units represent a departure in both design and construction, and company engineers call attention to the fact that the new industrial engine is not a conversion of any established Lycoming aviation, marine, or automotive power plant. In fact, tests show that these units will not even start on gasoline, being especially designed to function at highest efficiency only on natural gas or butane.

Before approval for production the engines were put through rigid and exhaustive tests. Toughest of these was a "full speed" test, where units picked at random were run at full speed under maximum loads for 100-hour periods. Another was a 30-day test during which time engines were started and stopped every 3 minutes, making a total of 14,400 starts and stops without any failures of engine starting gears or batteries, thus duplicating years of actual operation.

Innovations and design features include hydraulic valve tappets, which eliminate both tappet adjustment and valve grinding. Scavenging of the crank-case by means of a line to the intake manifold, which creates a partial vacuum, permits water vapors to be drawn off, eliminating emulsifying or sludging of crank case oil. A constant temperature of 160 degrees is controlled by a by-pass thermostat, resulting in an even 160 degree oil temperature, and prolonging the life of engine lubricants. A patented, close-regulating, fully-enclosed, ball-bearing governor is gear-driven and self-oiled. Incorporated into this device is a patented, frictionless valve and linkage construction of unusual ruggedness and efficiency. Pressure lubrication of all moving parts is accomplished through drilled passages, thus avoiding trouble resulting from exposed oil lines. Tin-plated, five-ring, cast iron pistons allow close fitting without danger of seizing, while oil baffle plates just above the piston pins prevent the formation of free carbon caused by contact of oil with hot piston heads. Carburation is a down-draft type, true proportional gas-air mixer, with a positive automatic shut-off when the engine is not operating. Packless, high velocity water pump, water-jacketed, explosion-proof exhaust manifold, oil filter, and air cleaner, together with large radiator, among many other features, make these engines efficient, economical to operate and to maintain.

Standardization of parts and accessories for all models affords interchangeability of timing gears, water pump assembly, governor

Positive
Protection
On gas holders, washers, purifiers and accessory equipment and on pipe lines and service pipe use NO-OX-ID for economical, long lasting protection. The action of NO-OX-ID is positive. It is adaptable to all service conditions. Investigate NO-OX-ID.
DEARBORN CHEMICAL COMPANY
Los Angeles: 807 Mateo Street, Phone TRinity 3385
San Francisco: 421 Bryant Street, Phone SUtter 8688.
NO-OX-ID
IRON-RUST
TRADE MARK
The Original Rust Preventive

assembly, clutch power take-offs, etc. Full accessibility of moving parts, large inspection and service plates, and the absence of external moving shafts or parts, aid maintenance and promote safety.

Especially interesting to the gas industry are Lycoming's electrical generation, stationary, and water-well pumping engines. Stationary and irrigation units come equipped with Twin Disc clutch power take-offs and either battery ignition and electrical starting or magneto and hand cranking as specified. All Lycoming units are built in three models rated at 25, 37.5, and 50 hp. (at 75 BMEP and 1,000 ft. piston travel per minute).

The electrical generation units for the generation of power for private consumption are manufactured in either single-engine direct connected models, or dual-engined units. Single engine units in three models of 10, 20, and 30 kw. are powered with 4-, 6-, and 8-cylinder engines respectively. These units are particularly adapted for service requiring 8 to 18 hours daily operation under constant loads, such as occurs in gasoline service stations, garages, and various types of retail stores.

The dual-engined units are manufactured in 25-, 35-, 40-, 50-, and 60-kw. models. It is not essential to use engines of equal hp., it being possible to operate two different types of engines in this design. For example, the 35 kw. generation unit is made up of a four-cylinder and a six-cylinder engine driving the same generator. In operation, any increase in electrical load over the capacity of one engine, automatically cuts in the second engine, which is also automatically cut out when the load decreases. Either engine is capable of handling 60 per cent of the rated generator capacity.

Dual-engined units are especially designed for continuous 24-hour operation under varying load conditions. Two engines drive a generator through heavy-duty over-running clutch power take-offs and multiple V-belts. Either or both engines operate entirely automatically, depending on the electrical load. Either engine may be shut down for servicing without interruption of the generator output. The use of two engines and one generator also gives 20 to 50 per cent greater economy under varying loads. The two-engine drive is an exclusive Lycoming development and is ideal for consumers requiring a continuous but varying supply of electrical energy.

All Lycoming generating plants deliver three-phase 110-220 volt alternating current, although direct current generators may be specified for particular installations.

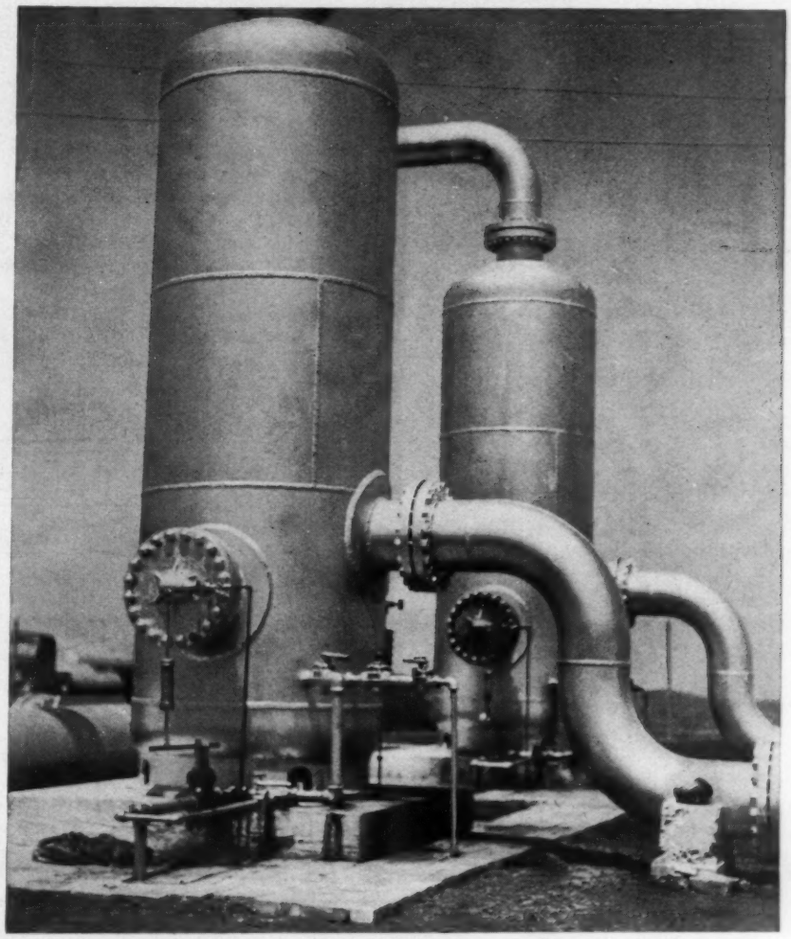
Backed by national exploitation, these electrical generation plants have aroused interest with private installations already completed in Memphis, Tenn.; Shreveport, La.; Chicago, Ill., and Los Angeles, Calif.

Lycoming officials are planning the early establishment of distributors at key points and dealers who will have complete parts and personnel for the efficient servicing and maintenance of plants throughout the nation.

■ ■

New Quarters for Detroit Co.

Detroit Lakes Gas Co., Detroit Lakes, Minn., has moved into its new McKinley avenue building, a one-story brick and tile structure housing both the central offices and warehouse.



Mist-D-Fier scrubbers installed for the Kettleman North Dome Association at Kettleman Hills, Calif. Each designed to handle 100 M M cubic feet per day, at 450 pounds working pressure, with shells designed for 600 pounds.

PARKHILL - WADE , INC.
CONSULTING AND CONSTRUCTION ENGINEERS
973 NORTH MAIN STREET
LOS ANGELES
Affiliated with The Stearns-Roger Mfg. Co., Denver

CRANEQUIP throughout for years of satisfactory service. Specify Crane Valves—Fittings—Fabricated Pipe—Piping Accessories

CRANE

CRANE CO., GENERAL OFFICES: 836 S. MICHIGAN AVE., CHICAGO, ILLINOIS

Branches and Sales Offices in One Hundred and Sixty Cities

P.C.G.A. Women's Committee Booklet in Second Year

"PUBLIC Utility Women," issued by the Women's Committee of the Pacific Coast Gas Association, has started its second year with a 19-page mimeographed publication edited by Doris H. Allen, chairman of the committee. Miss Allen is with the advertising department of the Los Angeles Gas and Electric Corp.

The first issue under Miss Allen's editorship contains suggestions for organizing new women's committees in gas companies, material suitable for reprinting in company bulletins, biographical sketches of successful women in the industry, a letter from and a biographical sketch of James F. Pollard, president of the Seattle Gas Co., who is president of the Pacific Coast Gas Association, and a department called "Open House," for the "exchange of ideas, news items, and general hearsay."

■ ■

Hope for Commercial Gas In Snohomish, Wash., Test

Gas believed to be in commercial quantities is reported to have been found by the Graham Development Co. during drilling of its No. 1 well on the Snohomish Dome east of Snohomish, Wash.

No test of volume has been made, according to news reports, but the company believes it will be in sufficient quantity to provide fuel for the No. 2 well, to be a deep test of the structure.

Positive acting Back Pressure Valve

Another Connelly development for the gas industry that provides a positive check against reverse flow in pipe lines, and prevents the danger of air being forced back into the distribution system. Extremely sensitive due to light weight disc, perfectly balanced and properly designed to open at very slight differential in pressure. Subjected to under-water tests far in excess of service pressures, insuring dependability under the most exacting conditions. Write for Bulletin No. 301-B-1.

Connelly Back Pressure Valve —Also furnished with Auto Vent for automatic relief of accumulated pressure of air.

CONNELLY IRON SPONGE & GOVERNOR CO.
Chicago, Illinois • Elizabeth, New Jersey
Pacific Coast Representative: Harry V. Payne, 3834 Third Ave., Los Angeles, Calif.

The Goodman Stopper

The Reliable Shut-off for Street Mains

Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, N. Y.

Pac. Coast Rep.: C. B. Babcock Co.
135 Bluxome Street
San Francisco, California

AIR CONDITIONING
Electrogas
HEATING EQUIPMENT

FURNACES BLOWERS FILTERS WASHERS

Write for attractive Dealer proposition

ELECTROGAS FURNACE & MANUFACTURING CO.
2575 Bayshore Boulevard, San Francisco

MODERN METHODS AND MATERIALS

A letter to GAS will bring you any of the selected reference bulletins listed below, without cost. Indicate by number which you desire.

NO. 172—CONTROLLERS

Non-indicating controllers for temperature, pressure and time described in a well illustrated catalogue. Contains discussions of the various types of instruments and their applications.

NO. 173—pH MEASUREMENT APPARATUS

Illustrated catalogue covering a line of apparatus for hydrogen ion concentrations describes electrodes, potentiometers, potentiometer-electrometer and galvanometers for determining pH of aqueous solutions. Covers equipment for process control and laboratory analysis.

NO. 174—GAS HOLDERS

Bulletin describes a line of single-lift gas holders. Contains installation photographs, diagrams and capacity tables.

NO. 175—RECORDING THERMOMETERS

Pamphlet covering a flow thermometer which incorporates several special features of design, gives specification data and lists accessories.

NO. 176—GAS ENGINES

Illustrated folder describes a line of 3, 4, 6 and 8 cylinder gas engines rated at from 50 to 60 h.p. per cylinder. Contains rating curve and drawings showing design.

NO. 177—PRESSURE REGULATORS

Chart designed to enable anyone to make a quick selection of the proper type of pressure reducing valve for any kind of service on steam, gas, air, oil or water.

NO. 178—SOLENOID VALVES

Thirty-two page illustrated catalogue covers an extensive line of solenoid operated valves giving specification table for each type of valve.

NO. 179—FIELD REGULATORS

Bulletin describes a line of field regulators made in several types and sizes for a wide range of conditions.

NO. 180—POWER PLANTS

Illustrated bulletin covers a new line of engines designed exclusively for gas operation and which are being offered as complete generating units. Contains specifications and rating curve.

NO. 181—FLOW METERS

Comprehensive line of flow meters in both electric and mechanical types for indicating, recording and integrating covered in a 56-page illustrated catalogue. Discusses principles of operation and applications.

NO. 182—PRESSURE RECORDERS

Eight-page bulletin describes a line of low range pressure and draft recorders and controllers.

NO. 183—GAS ALARM

Illustrated bulletin describes an instrument for continuously sampling atmospheres and which gives an electrical warning when combustible gases or vapors are present in excess of a predetermined limit.

HOTZONE Welsbach Conversion Line--

Meets the demand for a low cost, efficient automatic gas water heater to displace non-automatic heaters.

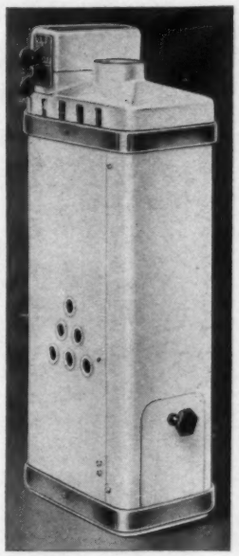
Hotzone utilizes a luminous flame burner with 100% Safety Gas Shut-off and a graduating direct acting thermostat. Heaters are beautifully finished.

Capacities—Seven and fourteen gallons per hour.

Write for catalog.

Welsbach Company

Gloucester City, N. J.—Branches—Chicago, San Francisco



HOTZONE
NUMBER SEVEN

★ ★ ★ ★

Welsbach Automatic Gas Water Heaters are scientifically designed to give perfect hot water service . . . Built by pioneers in the manufacture of gas burning appliances since 1887.

Write for Details of Our Complete Line.

HOTZONE:

Streamline
Master Line
Standard Line
Special Line
Combination Line
Conversion Line

Clean Up THE COMPLAINT *at the source*

● It is both easy and economical to furnish clean gas to the consumer through the use of Blaw-Knox Gas Cleaners.

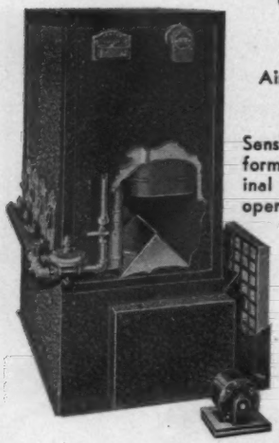
BLAW-KNOX COMPANY
2033 Farmer's Bank Building
Pittsburgh, Pennsylvania

BLAW-KNOX GAS CLEANERS

BLAW-KNOX

NEW LOW COST

FRASER



Gas Furnace and Winter Air Conditioning System

Sensational in performance, low original cost and low operating cost.

Write for details today.

Manufactured by

Fraser Furnace Company

Stockton, Calif.

Distributed by

H. R. Basford Company

San Francisco Los Angeles

In Los Angeles it's the

HOTEL CLARK

Fifth and Hill

555 Rooms-Baths

from $2.50 PER DAY

Famous for Good Food from Coast to Coast

RIGHT downtown in the center of things. Easy chairs, sleep-inspiring beds, large rooms with luxurious fittings.

P. G. B. MORRISS
Manager

A-B Stoves, Inc. Announces New Streamline Models

Completely new gas ranges are being offered by A-B Stoves, Inc., Battle Creek, Mich. All models capitalize on the present popularity of streamlining.

The new line comprises six different sizes, from a six-burner, double oven model, down to an apartment house model with four burners and large single oven, Model No. 37-156. The Model No. 37-146 is particularly designed for the lower priced bracket.

A few features of the four Aristocrat models are the automatic oven heat control

with the new "Thermal-Eye"; table service broiler, an exclusive A-B feature; self-aligning, finger-tip control drop covers; acid-resisting enamel work top. Each range has its individual added conveniences, such as warming compartments and service drawers. The sizes vary in width from 40-in. to 18½-in.

A new catalog sales-book, the size of *Fortune* magazine, is to be furnished for the dealer's use in his show room and in homes of prospects. The cover is printed in four colors and the book is bound in white plastic binding.

■ ■

Domestic Manufacturing Co. Announces New Pilot Valve

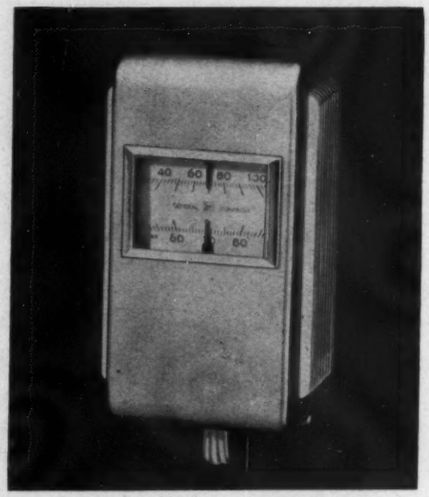
Domestic Manufacturing Co., 700 E. Florence Ave., Los Angeles, Calif., announces a new 100 per cent shut-off automatic pilot valve for water heaters and a new automatic electrically operated furnace pilot.

The water heater pilot valve shuts off the pilot as well as the main supply upon pilot failure. It is reset manually merely by turning a button. The automatic furnace pilot cuts off the gas line whenever the pilot or the current fails.

■ ■

Reynolds Regulator Offers New Range Device

Announcement is made by the Reynolds Gas Regulator Co., Anderson, Ind., of the new Reynolds R-10016-E2 Regulator with automatic cut-off designed for use on automatic gas ranges. It is small and extremely compact, affording easy installation. The body is of brass. Operation is spring type. It is recommended for low inlet pressure reducing to inches W. C. in any installation where the automatic cut-off is desirable.



General Controls Offers Low Thermal Inertia Thermostat

GENERAL Controls Co., New York, has just announced a room thermostat under the trade name of the Metrotherm. This new thermostat is of low thermal inertia and embodies a new device for easy adjustment of the degree of heat acceleration to the load characteristics and the type of installation to be controlled. In this way, maximum sensitivity and quick response to small temperature change can be obtained in each individual installation.

Two slender pointers indicate the setting and the actual room temperature. Vertical louvres on the side allow free circulation of air, yet completely conceal the internal mechanism. The Metrotherm is finished in satin silver and chromium.

It is available with timer, but the locking device is standard. A night switch is available at no extra cost.

■ ■

Report of Larned Municipal Gas System in Error

Relying upon information from supposedly authoritative source sent in response to a query from GAS, this magazine printed in the March issue that Larned, Kan., had voted to build a municipally owned and operated gas distribution system. Details of the plans were given.

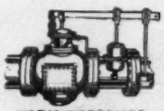
The statements as published were in error. The voters of Larned defeated the proposed bond issue, 943 to 635. The Kansas Power and Light Co., Salina, Kan., which serves Larned thereby won a convincing "vote of confidence."

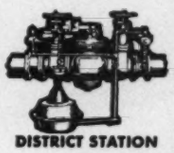
■ ■

Perkins to Head Koppers Co. Western Gas Division

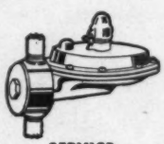
J. T. Tierney, president of Koppers Co., has announced that W. F. Perkins, vice-president in charge of the American Hammered Piston Ring and Bartlett Hayward Divisions of Koppers Co. and its subsidiary, The Maryland Drydock Co., all in Baltimore, Md., also has been placed in complete charge of the company's Western Gas Division in Fort Wayne, Ind., which supplies the public works and manufactured gas fields.

Reynolds


HIGH PRESSURE


DISTRICT STATION

INDUSTRIAL


SERVICE

LOW PRESSURE

FOR EVERY ✓ GAS CONTROL REQUIREMENT

☆ **Not only because Reynolds Gas Regulators have 45 years of developing, designing, building and testing behind them . . . but also because Reynolds have developed their Regulators with the industry . . . those are some of the reasons why these proved regulators are recognized by the industry's engineers as the thoroughly reliable, dependable control factors that have more than kept pace with the times.**

Reynolds nearest branch, representative or the home office . . . all are immediately available for full co-operation.

☆

REYNOLDS PRODUCTS

High Pressure Service House Regulators—Straight Lever Type—Models 0-10-20 series; Toggle Lever Type—Model 30 series.

Low Pressure Service or Appliance Regulators.

District Station Regulators, Single or Double Valve—Auxiliary Bowl and Automatic Loading Device Optional.

High Pressure Line Regulators—Pilot Loaded—Pilot Controlled.

Toggle Type Regulators—Single Valve, Double Valve, Triple Outlet.

Seals—Dead Weight or Mercury . Back Pressure Valves . Automatic Quick Closing Anti-Vacuum Valves . Automatic Shut Off Valves . Lever Operated Valves . Louver Operated Device . Atmospheric Regulators . Vacuum Regulators.

Branch Offices:
421 Dwight Building
Kansas City, Mo.
2nd Unit,
Santa Fe Bldg.
Dallas, Texas

Representatives:
Eastern Appliance Co.
Boston, Mass.
F. E. Newberry,
Avon, N. J.

REYNOLDS GAS REGULATOR CO.

ANDERSON, INDIANA, U. S. A.

GAS CONTROL SINCE 1892

"YOU CAN SEE YOUR BREATH"

That's **condensation** — exactly what happens when hot furnace air strikes cold chimney surfaces—CONDENSATION occurs.

It deposits water on porous brick or mortar and is absorbed; when cold enough it freezes and **E-X-P-A-N-D-S.** Add to that the fast corrosive action of acids and you have the first wedge in chimney disintegration.

ARREST and PREVENT that needless destruction by installing **Vitroliner**—the permanent chimney liner.

QUALIFICATIONS—

1. Heavy gauge enameling stock iron—coated both **inside** and **out.**
2. Acid resisting vitreous enamel.
3. Bell & Spigot type joint insures uniform fit.
4. All shapes and sizes necessary to simplify lining of **all types** of chimneys.

PROOF— The "Blue Chips" of the Gas Utility Industry have established over a period of six years, positive proof of the high efficiency of Vitroliner—evidence that corrosion by condensation can be controlled and completely eliminated if you use

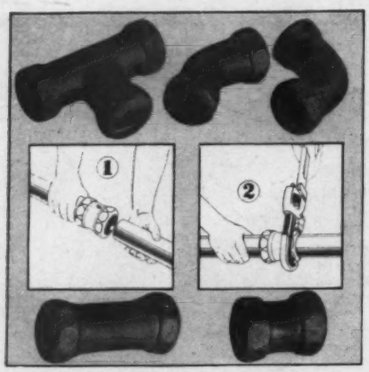
VITROLINER the permanent Chimney Liner

Information and prices on an entire line of condensation equipment will be sent on request.

CONDENSATION ENGINEERING CORPORATION

TELEPHONE MONROE 1031

335 South Western Avenue, Chicago



Standard Line of Fittings Announced by S. R. Dresser

S. R. Dresser Manufacturing Co., 460 Fisher Ave., Bradford, Pa., has announced a standard line of Dresser Style 65 Fittings designed to mitigate time lost in cutting pipe to exact lengths, in threading, grooving, flaring, or screwing up joints in cramped quarters. Nothing but an ordinary wrench is needed to complete a joint.

After inserting the plain-end pipe into the fitting (which comes completely assembled), it is only necessary to tighten two threaded octagonal follower nuts with a few quick turns of the wrench. As this is done, resilient "armored" gaskets at each end of the fitting are compressed tightly around the pipe, forming a positive seal. The resulting joint, Dresser engineers point out, is not only permanently tight but absorbs normal vibration, expansion and contraction movement, and permits deflections of the pipe in the joint.

The complete line of Style 65 Fittings includes: standard and extra-long couplings, ells (both 45° and 90°), and tees, all supplied in standard steel pipe sizes from ½ inch I.D. to 2 inch I.D., inclusive, black or galvanized.

■ ■

Ensign Carburetor Chicago Office Offers Full Service

Ensign Carburetor Co., Huntington Park, Calif., maintains a branch office in Chicago, Ill., at 2644 South Michigan Ave., for the convenience of Ensign customers in the East and Middle West. The company reports that users of carburetting equipment of all types can expect their orders to be filled promptly from stock. Kept on hand at all times are large numbers of Ensign gasoline, natural gas, and combination gas and gasoline carburetors, fuel regulators, heat exchangers, and auxiliary equipment for conversion to these fuels; as well as natural gas and butane-propane adapter assemblies for Ford V-8 power units. The company manufactures carburetting equipment for all fuel.

■ ■

P.W.A. Project Gas Ranges

A total of 183 gas ranges, incorporating unique and advanced economy features, will be installed in the Cedar Springs low rent housing project of PWA at Dallas, Texas.

New Unit Air Conditioners Announced by Carbondale

A NEW line of unit air conditioners with a wide range of air and refrigeration capacities is announced by the Carbondale Division of Worthington Pump and Machinery Corp., Harrison, N. J.

The manufacturer states that these units are built on field-tested, standardized designs. Each element is a complete and separable section in a compact cabinet, making assembly easy and speedy. One section contains the fan assembly with motor, another the coil and humidifying assembly, and another the base and cleaning elements. Any section may be shipped or handled separately.

A complete air conditioning job, including cooling and dehumidifyng, heating and humidifying, and cleaning and air circulation is accomplished by these units. They are available with or without humidifying and heating elements.

All moving parts are readily accessible without dismantling the unit.

■ ■

H. P. Hahn Joins Crosby Steam Gage Engineering Staff

Henry P. Hahn has become a member of the engineering staff of the Crosby Steam Gage and Valve Co., New York. Mr. Hahn was attached for many years to the engineering staff of the Crane Co., and for the past five years has been chief engineer of the oil and refining department of the Société Anonyme des Établissements Jules Cocard, Paris, France.

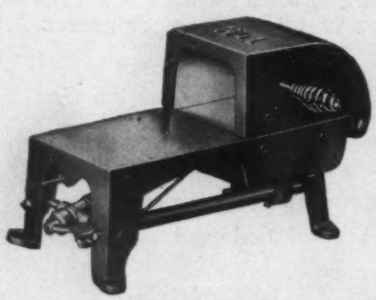
■ ■

Western Gas Builds Station

A compressor station is under construction 9 miles west of Benson, Ariz., by the Western Gas Co., El Paso, Texas, to increase the pressure of natural gas piped into Tucson and Phoenix, Ariz. Construction will cost $300,000, according to news reports.

JOHNSON NO. 1 BENCH FURNACE

Powerful . . . Speedy . . . Efficient



Here's a small, compact, single burner Bench Furnace that does outstanding soldering or heat-treating work. Heats soldering coppers up to six pounds per pair and heat-treats any carbon steel tools or parts. The firebox is lined with a special refractory lining to insure uniform heat and high temperatures. Curved shaped hood forces a return blast of hot air over top of coppers or parts to be heated. A completely satisfactory burner in every respect. Write for free catalog.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

Western Representative:
C. B. Babcock Co.
135 Bluxome Street
San Francisco, Calif.

Eastern Representative:
J. H. McPherson
250 Stuart Street
Boston, Mass.

BASO

THERMO ELECTRIC SAFETY CONTROL FOR GAS BURNING APPLIANCES

BOILERS ★ FURNACES ★ CONV. BURNERS ★ SPACE HEATERS ★ UNIT HEATERS ★ AIR CONDITIONERS OVENS ★ RANGES ★ WATER HEATERS, ETC.

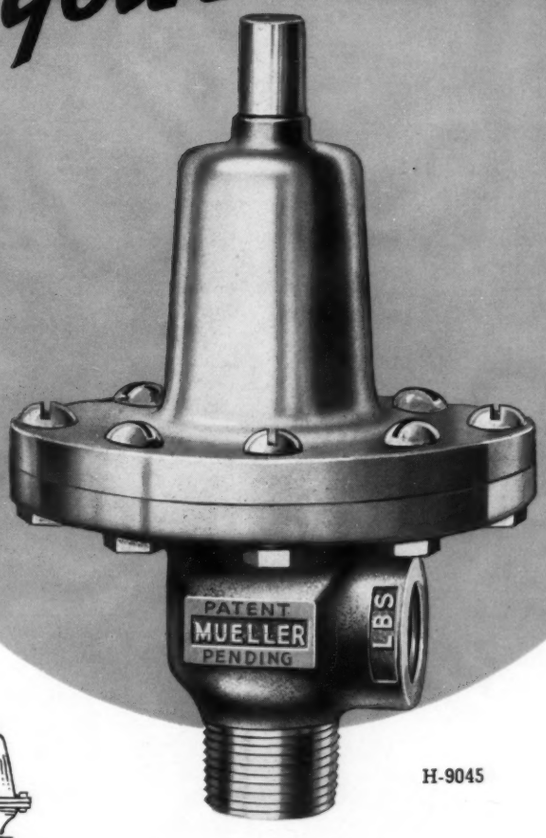
GAS VALVE SERIES 500

MILWAUKEE GAS SPECIALTY CO.
MILWAUKEE ★ WISCONSIN

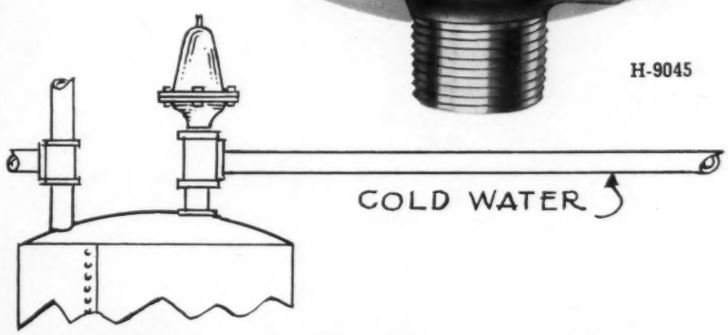
ELECTRIC SWITCH SERIES 600

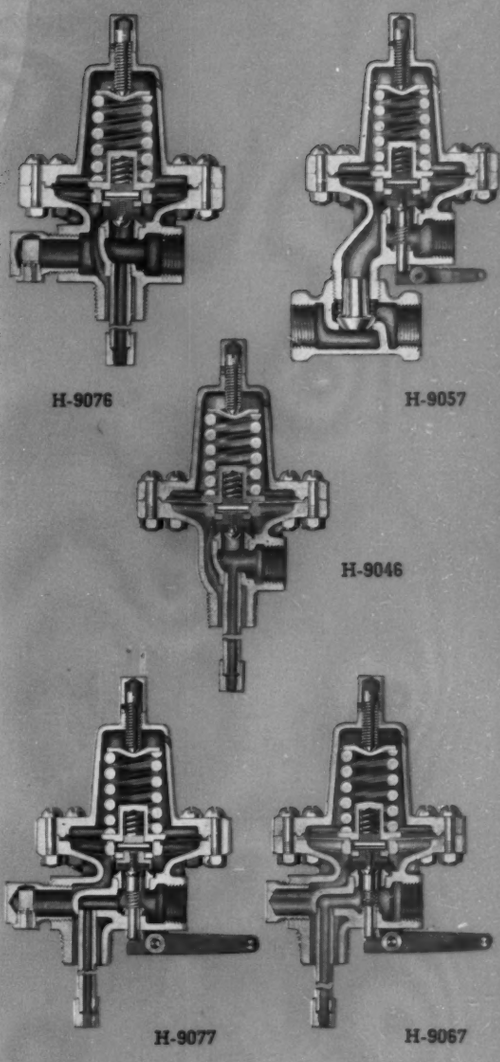
For your Protection

MUELLER VALVES ARE STANDARDIZED EQUIPMENT



H-9045





H-9076 H-9057 H-9046 H-9077 H-9067

A relief valve is a safety device, protecting against abnormal pressure or temperature or both. To reach its fullest efficiency such a valve must be absolutely tight up to the safety limits and then open wide before pressure reaches the danger point. In the new series of Mueller Relief Valves, faults common to this type of equipment have been completely overcome.

The Mueller auxiliary spring construction achieves for the first time a tight valve with a lightly seated composition disc. Repeated laboratory and field tests have shown that Mueller Relief Valves operate at an extremely light pressure rise and close tight without drip when pressure recedes.

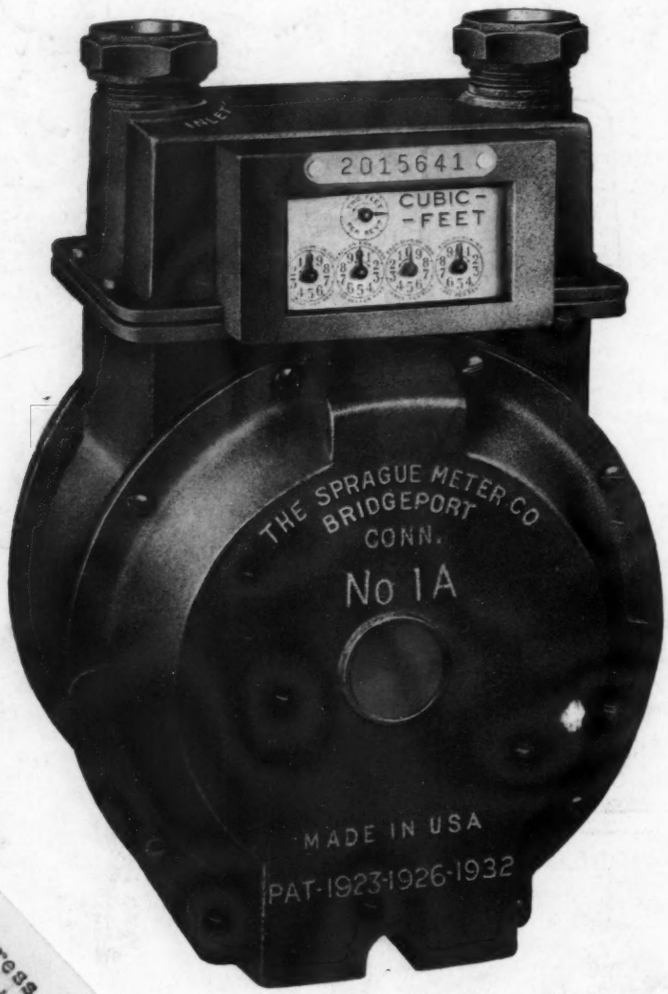
For perfect safety insist on Mueller Relief Valves.

MUELLER CO. Decatur, Ill.

Only the best valve is Good Enough!

MUELLER

GAS DISTRIBUTION EQUIPMENT



Library of Congress, C
Att: Periodical Division,

SPRAGUE METERS

REDUCE OPERATING COSTS

THE SPRAGUE METER COMPANY

LOS ANGELES + + SAN FRANCISCO

BRIDGEPORT, CONN.